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Advances in Medical Defense Against Thermonuclear Injuries*

By

REAR ADMIRAL CHARLES F. BEHRENS, MC, *U. S. Navy, Retired*†

Admiral Behrens graduated from the University of Pennsylvania Medical School in 1920 and entered the Navy shortly thereafter. Like myself, he had his first duty in Portsmouth, entering the Navy, I think, in 1921. His primary interest has been radiology and he has served as Radiologist and Radiological Consultant in many naval hospitals, including the Hospital Ship RELIEF. He is a Diplomate of the American Boards of Radiology and Internal Medicine, a Fellow of the American College of Radiology, and a member of the New York Academy of Sciences and of other professional societies. He served as Director of the Atomic Defense Division (now Special Weapons), as Commanding Officer of the Naval Medical Research Institute, and representative of the Office of Naval Research on the Project East River Committee, which in 1952 made a comprehensive civil defense survey. Admiral Behrens is Editor of *ATOMIC MEDICINE*, the third edition of which is scheduled for publication early in 1958. Since his retirement in 1955, Admiral Behrens has been the Radiologist for the Yater Clinic, Washington, D.C., and Radiological Consultant also to the National Naval Medical Center. It gives me very great pleasure to introduce Admiral Charles Behrens, United States Navy, retired.

ADMIRAL MORRISON

WHEN the first nuclear weapons were detonated in 1945 the whole world was startled, shocked, and not a little horrified. These new engines of destruction were of new and fantastically higher orders of magnitude than anything heretofore experienced, and compounded the traumatic havoc they wrought with the new and grievous addition of radiation injury.

And now in recent years thermonuclear weapons have entered the scene, raising explosive powers a thousandfold again. Fortunately, effects are not in direct proportion but usually follow the cube root so that the thousandfold increase in power produces only a tenfold increase in destruction. Nevertheless, the possibilities are appalling and readily can be used as an excuse to do little or nothing. However, this tendency has probably not handicapped preparedness as much as the feeling that "it can't and won't happen," that we have now attained the status of "Pax Atomica." Let us hope this is so, but also it should be recollected that before 1914 there was a widespread feeling that a gigantic conflict such as World War I simply couldn't happen—that the people would not stand for it—but it did happen. Not only World War I and II but the affair in Korea.

It is well, too, to bear in mind that a country well prepared to resist and recover from nuclear weapon attacks makes a much less tempting target. Again, preparedness for disaster pays big peacetime dividends because every year brings its quota of disasters. Studies of some recent ones are very illuminating as to the benefits of good organization and readiness and also as to confusion, delays

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† Yater Clinic, 1780 Massachusetts Ave., N.W., Washington 6, D.C.

TABLE 1

BOMB SIZE AND TYPE OF DAMAGE	RANGES OF CERTAIN BOMB EFFECTS OF MEDICAL INTEREST IN MILES (Air Burst) (See Preceding Text)											
	¼	½	1	1½	2	3	4	5	10	20	40	NOTES
1 Kt. BLAST (Apt. Damage)	TOTAL	LIGHT	LIGHT	LIGHT								
1 Kt. FLASH BURNS (Degree)	3	2										
1 Kt. FABRIC IGNITION	MOST (~12 cal/cm²)	FEW (~3.5 cal)										
1 Kt. INITIAL RADIATION	LETHAL >3000 REM.	SERIOUS ~300 REM.										
10 Kt. BLAST	TOTAL	TOTAL	LIGHT	LIGHT	LIGHT	LIGHT						
10 Kt. FLASH BURNS	3+	3+	3	2								
10 Kt. FABRIC IGNITION	ALL	MOST (>12 cal)	FEW (~7 cal)	FEW (~3 cal)								
10 Kt. INITIAL RADIATION	LETHAL >3000 REM.	LETHAL ~2000 REM.	SLIGHT ~50 REM.									
20 Kt. BLAST	TOTAL	TOTAL	MODERATE	LIGHT	LIGHT	LIGHT	LIGHT					
20 Kt. FLASH BURNS	3+	3+	3	2-3	1-2							
20 Kt. FABRIC IGNITION	ALL	ALL	MOST (>12 cal)	FEW (~7 cal)	FEW (~3 cal)							
20 Kt. INITIAL RADIATION	LETHAL	LETHAL ~3000 REM.	SLIGHT ~100 REM.	SLIGHT ~30 REM.								
100 Kt. BLAST	TOTAL	TOTAL	TOTAL	SEVERE	MODERATE	LIGHT	LIGHT	LIGHT				LIGHT DAMAGE TO ~7 MILE
100 Kt. FLASH BURNS	3+	3+	3+	3+	3	2-3	1-2					
100 Kt. FABRIC IGNITION	ALL	ALL	ALL	ALL	MOST >12 cal	FEW ~6 cal	FEW ~4 cal					
100 Kt. INITIAL RADIATION	LETHAL	LETHAL >3000 REM.	CRITICAL ~700 REM	SLIGHT ~100 REM.								
1 MEGATON BLAST	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	SEVERE	MODERATE	LIGHT	LIGHT			
1 Mgt. FLASH BURNS	3+	3+	3+	3+	3+	3+	3+	3+	1-2			
1 Mgt. FABRIC IGNITION	ALL	ALL	ALL	ALL	ALL	ALL	ALL	MOST >12 cal	FEW ~5 cal			
1 Mgt. INITIAL RADIATION	LETHAL	LETHAL	LETHAL	CRITICAL ~600 REM.	SLIGHT ~60 REM.							
10 Mgt. BLAST	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	LIGHT	LIGHT		SEVERE DAMAGE TO 8 MILE
10 Mgt. FLASH BURNS	3+	3+	3+	3+	3+	3+	3+	3+	3	3		1st DEGREE BURNS TO 30 MILE
10 Mgt. FABRIC IGNITION	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	MOST >12 cal		
10 Mgt. INITIAL RADIATION	LETHAL	LETHAL	LETHAL	LETHAL >3000 REM.	LETHAL ~800 REM.	SLIGHT <30 REM.						
20 Mgt. BLAST	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	MODERATE	LIGHT	LIGHT	LIGHT DAMAGE TO 50 MILE
20 Mgt. FLASH BURNS	3+	3+	3+	3+	3+	3+	3+	3+	3+	3		2nd DEGREE BURNS TO OVER 30 MILE
20 Mgt. FABRIC IGNITION	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	MOST >12 cal	FEW ~4 cal	
20 Mgt. INITIAL RADIATION	LETHAL	LETHAL	LETHAL	LETHAL	LETHAL ~3000 REM.	SLIGHT ~80 REM.						

From "Atomic Medicine," 3rd Edition, 1958. Courtesy of Williams & Wilkins Co. Baltimore, Md.

and poor distribution of patients. Sharp, efficient operation cannot be improvised on the spot in the absence of such in difficult situations.

I would like to emphasize that in particular as it is often lost sight of and we simply assume that we are ready to meet a disaster anywhere, but that is not so. At least the activities that should take place are not run as smoothly as they should be. We can recall the confusion in the Texas disaster when a ship blew up in the harbor, and also in the case of tornadoes when things do not function as smoothly as they should. What happens is that there is no over-all organization or person charged with it; the people get in each other's way and there are too many ambulances and people at the scene; there is often ineffectual control of curious people, people visiting, as they always will, the scene of the disaster and all this results in considerable confusion. Casualties are then apt to all go to the nearest hospital, while other hospitals, perhaps just a little farther away, should be taking a part of the load. You cannot emphasize the importance of on-the-spot effective relief too much.

Let us now take a look at the picture of what confronts us as gleaned from the *Effects of Nuclear Weapons—1957*. This book replaces the old *Effects of Atomic Weapons* and contains a wealth of information, both general and technical. Space forbids extensive quotation, and there is, of course, a great amount of material beyond the scope of this text. However, in order to provide approximate comparisons in convenient form for the wide range of available nuclear weapons, I have prepared a chart which lists certain effects of medical interest in miles.

On the subject of blast damage, this is being presented in terms of the effects on multi-story brick apartment buildings. Such buildings, along with various brick dwellings of about similar resistance, house a goodly proportion of our people. Aside from the table, comparison with other types is of interest and we find that special windowless blast-proof heavy construction sustains only moderately severe damage from air bursts. Multi-story buildings of reinforced concrete and with small windows sustain very severe damage, verging on collapse, up to about six miles, from a 10 megaton explosion. The apartments mentioned above would be totally ruined by such a blast up to about six and one-half miles and severely damaged up to about eight miles.

The flash-burns shown here are given in terms of first to third degree. The calories cm^2 productive of burns vary with bombs of different calibre. The thermal radiation of smaller bombs is concentrated in shorter time intervals than is the case with larger ones, and so we find for instance that a 1 kiloton bomb causes third degree burns with 6 calories cm^2, a 100 kiloton bomb requires 8, and a 10 megaton burst, 11. That is simply because the heat is diffused over a longer period. Associated with the flashburns is "fabric ignition." The color of the fabric has a lot to do with it. Wide variations are found and color is very important. Certain dark rayons ignite at one to three calories cm^2, tan cotton shirts ignite at 7 calories for a 10 kiloton bomb, and 13 for a 10 megaton burst. Rayon gabardine of gold color at 9, and 20 calories cm^2 under similar circumstances; tan nylon hosiery at 5 and 10 calories. Wool at 16 and 35, without, however, continuing to burn. Wool is the most resistant of all as wool does not continue to burn. It just singes and that is the end of it.

Now we come to "initial radiation." Radiation is becoming of increasing importance. Initial radiation occurs in the first minute and comprises virtually all the dosage of clinical significance from the blast and fireball since in that time the fireball passes out of effective range. It does not include residual or fallout radiation. It is made up of gamma rays and neutrons. These account for about three percent of the explosion energy as contrasted to about thirty-three percent for thermal energy. The neutrons and gamma rays run pretty much neck-and-neck in the smaller bombs.

TABLE 2

RANGE OF NEUTRONS AND GAMMA RAYS

Bomb Size	Neutron Ranges in Miles		Gamma Ranges	
	1000 Rem	30 Rem	1000 r	30 r
20 Kt.	0.7 miles	0.9	0.65 miles	1.2
100 Kt.	0.8	1.2	0.8	1.4
10 Megaton	1.2	1.75	2.1	2.8
20 Megaton	1.4	1.8	2.3	3.1

The contribution of neutrons is of considerable importance with bombs of kiloton type, but of minor consequence in megaton bursts, the range of neutrons being notably shorter than those of gamma rays in the latter case, as noted in the tabulation at the top of the page.

Thus, the supralethal dose of 1000 rem for gamma rays extends about one mile further than the equivalent dose of neutrons in the case of 10 to 20 megaton bombs.

In general, however, the ranges for thermal and indirect blast injuries far outstrip those for serious effects from the initial ionizing radiation. Nevertheless, many people in substantial structures or otherwise protected from the former are bound to incur serious radiation exposure. The initial radiation is highly penetrating and about six inches of concrete or one and one-half inches of steel are required to reduce it by a half. Neutrons show more complex behavior but concrete will attenuate them more readily than in the case of gamma rays, producing a 10X reduction by ten inches. Residual and fallout radiations are not so penetrating and two and one-half inches of concrete will reduce gamma rays from those sources by about a half.

Valuable background information will be found also in the house Report No. 2946, 84th Congress, 2nd Session, 1956, entitled, *Civil Defense for National Survival.* In connection with Operation Alert of 1955, this report quotes an estimate of casualties from an "all-out-attack" on 60 cities in the United States and its possessions, with 61 bombs ranging from 5 to 20 megatons power as follows:

8¼ million dead the 1st day
8 million dead within 6 weeks with 3.9 million of these due to fallout
12 million injured survivors after the first day, with a third recoveries.

That indicates the significant change in the picture as a result of fallout. The fallout, of course, is something that need not happen. But the most significant thing is that if the enemy is going to give an all-out attack, the chances are he would use nuclear weapons in such a way as to produce a great deal of fallout. If a bomb is exploded high in the air, relatively little fallout occurs, but if it is detonated near the surface, there is a lot. A large amount of matter is sucked up of larger particle size than results from the explosion of a bomb, and these particles are also rendered radioactive by the neutrons, and fission products produce rapid and heavy fallout.

In view of these staggering figures, it appears worthwhile to mention something of civil defense possibilities related to reducing the magnitude. The Congressional Report quotes many authorities to the effect that well-built shelters would vastly reduce casualties. There is much argument as to the place of shelters and evacuation in the scheme of defense; and on the score of high expense and diversion of materials needed for other purposes, heavy emphasis has been placed on evacuation. Nevertheless, since it seems that intercontinental missiles with nuclear war heads and of practical operational type must soon be reckoned with and that shorter range types for launching from submarines should also become available, it ap-

pears that the period of warning is apt to become extremely brief for any effective evacuation. In addition, complications caused by fallout will be difficult to deal with. The authorities are all taking a closer look at the shelter program. Fallout greatly complicates the mission of the shelter.

The committee report quotes Mr. Strope, Director of the Weapons Evaluation Group, N.R.D.L., to the effect that properly constructed shelters could reduce a damage radius of about 15 miles to an order of 1 to 2 miles. "Shelter squeezes a 20 megaton down to a 20 kiloton size" (TNT equivalent). Dr. Tuve of Carnegie Institute and Chairman of the National Academy of Science Committee on Civil Defense is quoted as stating that a civil defense effort, costing several billion dollars and spread over a few years, may mean a difference of 60 million casualties or more in the event of an all-out war. General Nelson, who was chairman of the "Project East River" Studies of Civil Defense in 1952 and in which I was privileged to participate as the O.N.R. representative, testified that "a practicable and workable non-military defense program can be achieved and at a cost that is not prohibitive." Dr. Dunning of Atomic Energy Commission also mentioned the value of shelters and indicated that they were the only practical remedial measures at this time. A Project East River review committee proposed in 1955 a balanced program of shelter and evacuation with continued efforts in the direction of dispersing industry and population. It felt that evacuation as a single civilian defense measure had become largely unmanageable because of extended metropolitan areas and potential fallout hazard.

On the other side of the fence, deep, heavily-built shelters for large groups involve some high estimates of expense extending to many billions. Lieutenant General Sturgis, Chief of the Army Engineers, is quoted to the effect that available studies and experience with shelter and protective construction indicate that an effective program would be extremely costly. Evidently there are wide differences in types of shelter construction various estimators have in mind and there is need for much clarification. At all events, a comprehensive shelter program has not yet been started. However, some shelter expedients have been recommended, and former Administrator Peterson has urged people to build backyard or basement shelters if they lived 15 miles from a probable target area. He also mentioned: Trenches 2-feet wide and 3 feet deep along highways, or concrete pipe four or more feet in diameter and covered with three feet of earth along highways (the cost might run to $40 per person, or about one billion dollars); finally he mentioned light, concrete structures reinforced with steel and covered with 3 feet of earth. Finally, the effects of nuclear weapons describes a shelter conceived and planned by the F.C.D.A. It is of closed underground type for 30 people, but can be extended to hold more. Walls are 15 inches of concrete and a roof of 21 inches, with 5 feet of earth covering. The door is 8 inches thick, of structural steel and reinforced concrete, track mounts on 4 wheels. Ventilation ducts have filters and antiblast closures to withstand 100 psi. Thus, studies, proposals and arguments go on and on, but action lags. However, it is good to relate that not all effort has been vocal. Some very substantial gains have been made.

We have already mentioned an estimate of about 12 million injured survivors. Service technical estimate of October, 1955, gives an anatomical injury distribution of 12% head, face and neck; 15% thorax, 14% abdomen, 22% upper extremities, and 37% lower extremities. Severity is anticipated at 40% *minimal* cases returnable to duty immediately, 20% requiring *immediate care* to save life or limb, 20% who can wait for *delayed* care, and 20% so-called "expectant" cases critically injured and requiring complicated and prolonged care. To these cases the radiation group must be added later.

Much thought, discussion and planning has been devoted to the matter and it is well recognized that the lessons of war apply and that we must avoid taking care of one at the expense of many, that well-trained surgical

teams for special work save many lives, that various facilities and ample supplies must be available, that open treatment of burns will usually be the only practical immediate possibility, that medical sorting or "triage" is "the key" to the effective management of large numbers of casualties.

Stockpiling is of great importance and some headway has been made. Dr. Whitney, Director of the Health Office, F.C.D.A., in a recent paper quoted in a Navy Medical News Letter, stated that as of January 1, 1956, we had supplies for 4¼ million casualties for three weeks. Naturally, we need more but that is a substantial beginning.

Emergency hospitalization needs has occasioned the design of a 200-bed unit transportable on a single tractor truck; weight 13.5 tons, storage space 2,000 cubic feet; assembly time, 4 hours by 30 professionals with some auxiliary aid; floor space minimum, 14,000 square feet. A modern school building would furnish 10 suitable rooms for 20 patients each, 3 operating rooms and space for ancillary services—generators and a 500-gallon nylon tank included. The estimated cost in 1954 was about $26,500.

Coming now to specific professional medical advances, it is pertinent to note that a vast amount of clinical and basic research is in progress—far beyond the scope of this paper, and so I must content myself with a few items of special importance in the field of mass casualties. It is also well to remember that in our times the popular journals and newspapers usually feature advances in special articles long before complete formal scientific presentations appear in professional journals. This makes life all the more interesting and is frequently helpful, but it brings the decided perils both of overstimulated hopes and overwrought fears from inadequate evaluation and insufficient background material. Thus some wariness is advisable in accepting at face value early and often sensational reports.

Many of the most valuable advances in the field of injury and reconstructive surgery relate to tissue and blood banks. Great progress has been made in the preservation of bone, skin, blood vessels, corneas and blood. Much work has been done on bone at the Naval Medical Research Institute and one of the most promising studies relates to the anorganic variety. This is bone almost completely freed of its organic matrix by extraction with ethylenediamine. It can be stored without particular precautions at room temperatures, autoclaved before use, and used for grafts regardless of animal source. Preliminary studies are very promising and clinical trial is now underway.

In the case of burns, once the early phases are past, the problem of suitable dressings preliminary to homologous grafting will pose a huge problem. The work now in progress using embryonic bovine skin gives much promise.

Transplantation of corneas is a well-recognized procedure subject however to the short period of viability of the cornea between removal and transplantation. It now appears that great improvement may be possible in this regard. This is, of course, no emergency procedure but bound to be of great value when rehabilitation comes to the fore.

Of immense importance in burns, general surgery and clinical medicine, including the care of serious radiation injury, is the matter of electrolyte balance. The many advances in this field greatly brighten the outlook for many serious cases.

The value of blood for transfusions is well known, and also the difficulties from brief permissible storage time. It now appears that there are good possibilities of improvement by use of glycerol to increase the time red blood cells may be stored. Quick freeze methods are also being studied.

Much more and indeed an infinite amount of research could be cited but, in the interest of time, let me merely note as an example of present day work that the O.N.R. is currently supporting 24 clinical research projects, among which we find:

Work on dried plasma
Preservation of whole blood
Preservation of living homologous cartilage

Preservation of human skin
Plastic artificial cornea
Blood vessel repair
Evaluation of freeze-dried tissue
Evaluation of bovine embryonic skin

Coming now to radiation effects, we have already seen the figures for initial radiation. Let us now take a look at the fallout situation. Official publicity gives a picture of an elliptical area about 140 × 20 miles in which fallout is potentially lethal, plus an area up to 240 × 40 miles for lesser but still dangerous contamination. Calculations indicated a 36 hour dose of 2300 r at 100 miles and 100 r at 125 miles. A week later there would be 45 r/day at 100 miles and after a month 8 r/day. Such estimates are, of course, not realistic in human terms as reflecting inevitable exposure. They are also subject to marked variation, depending on height of burst, terrain and weather conditions. People can be warned and seek shelter.

An Atomic Energy Commission release by Dr. Willard F. Libby, June 3, 1955, provides data as follows:

"Radioactive fallout is the radioactivity which falls out of the atmosphere after the explosion of a nuclear weapon. In the ordinary atomic bomb, for 20,000 tons (TNT equivalent) about 2 pounds of radioactive materials are produced. In these 2 pounds are some 90 different radioactive species. . . . The mixture as a whole decreases in radioactivity in such a way that, for every sevenfold increase in age, the radioactivity is decreased tenfold. Thus the radioactivity by seven hours after the explosion has decreased to 1/10th the radioactivity at 1 hour; at 49 hours to 1/100; at 2 weeks to 1/1000 and at 3 months to 1/10,000."

That indicates very distinctly the value of some immediate shelter and shelter for just a matter of a few days will take the curse off effectively so that there can be some egress of rescue workers.

In regard to the water supply, it was recently mentioned that our dairies would be a big help to us because the equipment used for pasteurization of milk can be used to sterilize water in event of bacteriological warfare.

The effectiveness of various structures in reducing the radiation from fallout is shown in Table 3.

TABLE 3

EFFECTIVENESS OF STRUCTURES IN REDUCING RADIATION FROM FALLOUT

Type Structure	Approximate Attenuation Factor
Frame house, 1st floor	2
Ditto basement	10
Multi-story reinforced concrete Lower floors (away from windows)	10
Basement (surrounded by earth)	1000 or more
Shelter below grade	1000 or more

In other words, you would be fairly safe in a concrete building or in an underground shelter.

Popular speculation and interest appear mostly concerned with remote effects such as genetic and developmental damage along with carcinogenesis and with Sr^{90} featured as the villain. However, it turns out that the greatest peril is from gamma rays produced by various fission products. Sr^{90} is, of course, of great importance as some inevitably gains access to the body via the food chain. Fortunately the body of man favors calcium. Strontium is absorbed from the gastro intestinal tract to the extent of about 20%. Of a single dose parenterally administered, Robertson and Cohn in *Atomic Medicine,* state that 50-75% is excreted in a week and 95% in a year. The remaining 5% remains in the bone. Various figures have been worked out as to degree of carcinogenic effect (notably leukemia) but much more data are required for accurate evaluation.

In studies of people exposed in the Marshall Islands it was found that relatively few fission products gained access to the body. These included $Sr^{89\&90}$, Ba^{140}, I^{131}, and some rare earth elements. Levels of radioactivity fell rapidly and the degree of internal dosage was too low to have contributed significantly to an acute radiation syndrome. After 6 months, animals heavily exposed and brought back for study showed barely detectable radioactivity and to date no delayed effects.

In the matter of treatment (internal hazards) the best chances of reducing body content of a radioisotope is in the early stages. In an acute situation spinach and rhubarb (oxalates) minimize absorption and, of course recourse can be had to emetics and cathartics. High calcium diets also decrease absorption of Sr. A combination of intravenous calcium gluconate with oral ammonium chloride may be profitable.

After fixation in the body, decalcification therapy has not proven of practical benefit. Chelating agents are effective with Pu and some rare earths, but not Ra and Sr. A colloidal ion exchange carrier, zirconium citrate, is promising, but is effective only within hours of an exposure.

Skin Effects. Skin damage was a notable feature of fallout effects on the Marshallese and the damage mostly from B rays, and since these are much less penetrating than the usual types of X and gamma rays, the burns they produce are more like those from Grenz rays (X-ray of about 10 KV or less) and ultraviolet light. Moreover, simple precautionary measures such as the prompt use of soap and water will largely obviate them.

PROPHYLAXIS AND THERAPY OF ACUTE WHOLE BODY RADIATION INJURY

From the preceding it is obvious that in nuclear disaster our main problem lies here. Prophylaxis for "initial" radiation is of course impracticable, but it has its possibilities in the event of fallout, especially for "calculated risk" workers on rescue, first aid, monitoring or various essential missions. Body shielding is often dismissed from consideration because of the weight and cumbersome nature of materials requisite for a rather complete protection. It is well to remember here that we have an instance where very decidedly a half-loaf or even a few slices are better than none. Experimental work indicates greatly improved survival rates when the spleen or some significant portions of the bone marrow are shielded. It is not difficult to provide a zone of protection for the upper abdomen, the sternum and much of the femora. Gonadal shielding is also readily possible and in view of genetic effects, highly desirable.

A host of chemical substances have been found of some slight benefit when given prior to exposure, notably cysteine and glutathione preparations containing SH radicals. They are not of practical avail except for one complex substance, abbreviated "AET" (S_2B-amino- ethylisothiouronium Br, HBr). It is mentioned by Cronkite, Bond and Conard (in *Atomic Medicine*) as of promise. It appears of low toxicity, potent orally, and highly effective.

Following irradiation a few substances are of striking benefit, notably the injection of bone marrow or of splenic homogenate. These bring about rapid restoration of the hemopoietic tissues if given prior to exposure with less striking results post-irradiation. Sterile inflammation stimulates myelopoiesis in the mid-lethal range, but not the absolute lethal zone.

Much publicity has been given splenic and marrow homogenates, but it still remains to be seen if the procedure can be made practicable on the large scale of nuclear casualties.

The same applies to platelet transfusions. After much study it has become evident that the hemorrhagic phase of radiation illness is due to platelet deficiency and accordingly therapy to tide over the patient until platelets are again formed would be the thing to do. However, large scale utilization is as yet beyond us.

In the matter of benefits from spleen and marrow therapy there is much discussion as to whether the recovery in hemopoiesis is a humoral effect or due to cell transplantation. The latter is a proven fact but there is also probably a non-cellular factor as well. The cells concerned are intermediate between the primitive mesenchymal cells and the actively proliferating differentiated type.

In general we will have to fall back on treatment we are now more or less familiar with and hope that these newer leads will become of practical benefit soon. Our regular methods, plus excellent nursing care, accomplish a lot and it is worth while to review the

main features briefly as adopted from the account of Cronkite, Bond and Conard in *Atomic Medicine.*

First, diagnosis: Out of myriads of people showing varying degrees of nausea and vomiting some will have minor dosage and others major. Dosimetry, distance factors and monitoring readings may help in sorting the types, but many uncertainties will be present due to variable shielding, geometry of exposure, and individual susceptibility. Thus it appears that we will have to have a sharp eye for the clinical picture.

Fatal Cases are apt to show the following: Vomiting within a few hours and progressing rapidly into prostration with diarrhea, fever and early death. Great depression of the blood count occurs in 48 hours. Less serious cases in which recovery can be anticipated in 50% or more of cases will show nausea and vomiting but this will subside following which comes a relatively asymptomatic period of 1-3 weeks. Then comes the incidence of purpura, hemorrhages, agranulocytic infections, anemia and epilation. Such cases are unfavorably affected by any heavy exertion or exposure to temperature extremes during the period of intermission. The later constitutional symptoms are of course the result of pancytopenia.

Mild cases show only transient nausea with little or no vomiting on the first day. Late symptoms are possible but mild. Usually the patients note no untoward effects and blood studies would be required to demonstrate an effect. The only serious aspect is that low doses notably increase the seriousness and fatality rate of burns and other injuries.

Therapy involves the electrolyte balance, hemorrhage anemia and infection. Shock may be present in some cases and signifies a fatal outcome. Antibiotics are essential, but it is probably best to avoid prophylactic use of them. They will not be necessary unless the granulocytes go below 1000 or signs of infection occur. The best time to start antibiotics will usually be at 5-7 days. Penicillin plus broad spectrum antibiotics can be usually given by mouth.

Transfusions of whole blood should be reserved for severe anemia. Plasma, albumin and amino acids may be needed in the anorexic stage.

In general the program is (1) Rest and sedation, if necessary; (2) Bland, low residue diet; (3) Meticulous oral hygiene; (4) Proper fluid and electrolyte balance; (5) Antibiotics, transfusions and parenteral nutriments as mentioned above when and as indicated.

This brings to a close this dissertation, and in conclusion I would like to leave the impression that frightful as the nuclear warfare would prove, the situation is not hopeless, nor are we helpless. Much has been accomplished, though still far too little. We can do much more if we develop the will to do it and overcome the handicaps of conflicting council and the confused turmoil of attitudes which run the gamut from panic to fatuous optimism. That is a very large order, but we should not shirk it.

Detection and Defense Against Chemical Warfare*

By
VAN M. SIM, M.D.†

IF WE are attacked with such agents as nerve gases, it will require all the ingenuity and all the effort of everyone who is in the Medical Corps, the Nurse Corps, and Dental Corps, all the allied services of Federal civilian defense agencies, and anybody else who is willing to lend a hand. The important thing I would like to emphasize is, that if we are subjected to a nerve gas attack, the effects may come on within a very few seconds if the concentration is high enough.

Most prepared positions for defense against atomic warfare are ideal targets for nerve gas attacks. Historically speaking we were introduced to mustard in World War I. There were no actual gas attacks in World War II, primarily because of excellent counter espionage and counter-intelligence work of the services. The Germans thought we had nerve gas, which they had produced as early as 1943. We did not have it, but the game kept up until Germany was so surrounded by potential aircraft striking power that any use of such materials would have brought instant retaliation. Again, I would like to emphasize the fact that most of the prepared positions or shelters with the exception of those that are bacteriologically and chemically gas-proof, are good targets for chemical warfare agents.

The reason it is possible to speak of nerve gas today is that it has been announced to the American public that we do have such a chemical agent, which is called GB (Sarin). As a matter of fact, of the original German compounds, the first was called Tabun (GA); the second Sarin (GB). An important point about nerve gas is that it is odorless and colorless, thereby causing the detection of its presence a real problem. While the mask affords excellent protection, if one can mask quickly, there are other routes of entry into the body such as through the skin, which are important and equally fatal. The essential difference is that this route requires more time, but this time is again a question of minutes—not hours. These agents do penetrate through skin whether it is broken or unbroken. If there is an abrasion or cut in the area of deposition of the agent the entry is more rapid than through the intact skin.

The organic phosphorus insecticides which are sold in grocery and hardware stores are so-called "non-lethal nerve gases." They are all related to organic phosphates with somewhat similar structural formulas. The ones most commonly used for crop dusting and spraying in agricultural areas are Parathion (*O,O*-diethyl *O*-p-nitrophenyl phosphorothiolate); Malathion (*S*-[1,2-bis(ethoxycarbonyl) ethyl]*O, O*-dimethyl phosphorodithiolate); TEPP (tetraethyl pyrophosphate). There are a great number of these compounds on the commercial market with a variety of trade names.

We do not have to await a war to find out how these compounds affect people. In a recent survey of poisonings throughout the country, there were 46 cases that were either in the lethal or near lethal category. The following summary of these cases was compiled by Dr. Gustave Freeman and Dr. Marvin Epstein of the Clinical Investigation Branch of the Clinical Research Division, Army Chemical Center (tables 1-3, incl.).

The number of survivors who received treatment late were only 15%. Those who received it late and "high" were 60%; those who received it very early were 70%, and early and high were 92%, indicating the importance of early diagnosis and adequate treatment.

Table 4 shows the result of both acute and

* Presented at Medical Symposium, U. S. Naval Hospital, Portsmouth, Va., Oct. 17, 1957.

† Chief, Clinical Research Division, Medical Research Directorate, U. S. Army Chemical Warfare Laboratory, Army Chemical Center, Maryland.

TABLE 1

A STUDY OF 46 CASES OF POISONING WITH PARATHION OR TEPP

Lethal-Type Cases			
	Survived	Died	Total
Parathion	23	18	41
TEPP	0	5	5
Total	23	23	46

This represents a total of 46 fatal or nearly fatal cases. Of this number, there were 41 instances of Parathion poisoning with 18 deaths, and 5 instances of TEPP intoxication, all of which were fatal.

chronic exposures in a manufacturing plant. I am indebted to Dr. Maurice Gaon and Dr. Joseph Holmes of Denver, Colorado, for providing this information.

The exposure cases were arbitrarily divided into groups with varying percentage reductions of their control red cell cholinesterase values. It will be seen that the signs and symptoms most frequently noted referable to the eyes were miosis, dimness of vision, pain on accommodation, scleral injection and lacrimation. Constriction of the chest, cough, and dyspnea were the most common respiratory symptoms. Central nervous system signs and symptoms consisted of headache, dreams, fatigability and weakness, mood changes, muscle fasciculations and various paresthesias. Nausea and vomiting, and diarrhea were noted less frequently

TABLE 2

RESULTS OF THERAPY IN 23 POISONING CASES THAT SURVIVED

Therapy	No.	Survived
Early dual	10	10
Delayed adequate	7	7
Atropine adequate	3	3

Of those who received therapy, there were ten in number who received early dual therapy who had adequate atropine and artificial respiration. All survived. Of those who received delayed dual treatment, but whose treatment was adequate, all survived. Those who had adequate amounts of atropine survived.

TABLE 3

ANALYSIS OF THERAPY IN THE 23 FATAL CASES

Therapy	No.	Survived
Effect not maintained	5	0
Late, inadequate	8	0
None	10	0

In an analysis of the fatal cases it was noted that (1) either effective treatment was not maintained, or (2) they did not keep up artificial respiration or did not use atropine, or (3) where they had late inadequate treatment.

In defining what is "early" and what is "late," "early" means that the people were seen before 97 minutes had elapsed from onset of recognizable symptoms.

except in more severely poisoned cases primarily because mode of entry was usually via the respiratory tract.

Table 5 was prepared by Dr. Joseph Holmes to illustrate the clinical findings of an acute case of Parathion poisoning. The young man was loading and spraying Parathion the morning of his hospital admission. Around noon he collapsed at work and was taken to the hospital at the University of Colorado School of Medicine. The following tables are the hospital study of this patient. On arrival at the hospital he was given 3 grains of sodium luminal to help control convulsions as well as 1/50 grain of atropine. A total of 45.8 milligrams of atropine was given during the 19½ hour period following hospital admission. The admission blood cholinesterase values were near zero for both plasma and red cell cholinesterase.

It will be noted in table 7 that the electrolyte, hematocrit and serum values of the patient showed little definitive change. In the following findings of the same patient there were no definite indications of alterations from the normal which might be helpful to the attending physicians. There was a trend indicating adrenal stress in the first twenty-four hours, and possible altered blood coagulability, neither of which appeared significant.

The foregoing indicates the possibility that there may be little definite evidence in such

TABLE 4

ACUTE AND CHRONIC EXPOSURE IN A MANUFACTURING PLANT. CORRELATION OF SYMPTOMS AND CHOLINESTERASE REDUCTION

Signs or Symptoms	RBC ChE Reduction 25%		RBC ChE Reduction 25% to 40%		RBC ChE Reduction 40% to 60%		RBC ChE Reduction over 60%	
	No. of Cases	% of 497 Cases	No. of Cases	% of 69 Cases	No. of Cases	% of 30 Cases	No. of Cases	% of 14 Cases
Eye:								
Miosis	363	73	58	84	27	90	14	100
Lacrimation	80	16.1	18	26	10	33.3	5	35.7
Dimness of Vision	189	38	35	50.7	19	63.3	12	85.7
Impaired Accommodation	37	7.4	5	7.2	7	23.3	4	28.6
Pain on Accommodation	25	5	3	4.4	6	20	5	35.7
Injection	25	5	2	3	6	20	5	35.7
Nose: Rhinorrhea	378	76	53	76.8	24	80	8	57.1
Respiratory:								
Constriction of Chest	378	76	54	78.3	24	80	6	42.8
Cough	238	47.9	28	40.6	18	60	2	14.3
Wheezing	26	5.2	4	5.8	3	10	3	21.4
Dyspnea	166	33	21	30.4	12	40	3	21.4
C.N.S.:								
Headache	170	34	29	42	14	46.7	9	64.3
Dreams	94	19	19	27.5	9	30	8	57.1
Fatigability & Weakness	128	26	20	29	11	36.7	3	21.4
Mood Changes	87	18	20	29	11	36.7	5	35.7
Increased Perspiration	51	10	15	21.7	5	16.7	7	50.0
Dizziness	46	9	10	14.5	2	6.7	4	28.6
Fasciculation	11	2.2	2	2.9	1	3.3	2	14.3
Paresthesias	22	4.4	5	7.2	5	16.7	3	21.4
G.I.:								
Anorexia & Nausea	95	19	11	16	10	33.3	8	57.1
Vomiting	19	3.8	0	0	5	16.7	3	21.4
Diarrhea	20	4	1	1.5	1	3.3	2	14.11
G.U.:								
Backache, frequency, or Nocturia	22	4.4	5	7.2	1	3.3	1	7.1

exposure cases other than the history, signs and symptoms and reduction of blood cholinesterase levels.

In review of the clinical signs and symptoms seen in the acute case of anticholinesterase poisoning, the following is quite typical of the course of events when the exposure is via the respiratory route. The most common initial complaint is of throat and/or chest tightness. Rhinorrhea develops which becomes persistent and profuse. Wheezing may develop and there is increased difficulty in breathing. Severe bronchospasm may develop and there may be profuse salivation. All of this may come on fairly rapidly within a very few minutes after exposure; sweating and localized muscular fasciculation may occur; incoordination follows; patient may fall, tonic and clonic convulsions follow. There is prostration and gasping, then the heart be-

TABLE 5

ATROPINE DOSAGE GIVEN DURING THE FIRST 24 HOURS OF TREATMENT FOLLOWING ACUTE PARATHION POISONING (ONE CASE)

Date	Time	Grains	Grams	Note
7-28-55	1:30 p.m.	1/50th	.0012	3 grains sodium luminal
	2:20	1/50th	.0012	
	3:05	1/20th (IV)	.003	
	3:05	9/20ths (IM)	.027	
	4:00	1/50th	.0012	
	4:50	1/50th	.0012	
	5:20	1/50th	.0012	
	6:00	1/50th	.0012	
	6:30	1/50th	.0012	
	7:00	1/50th	.0012	
	7:30	1/50th	.0012	
	10:00	1/50th	.0012	
	12:00	1/50th	.0012	
7-29-55	2:00 a.m.	1/50th	.0012	
	5:00	1/50th	.0012	
	9:00	1/50th	.0012	
Total			.0458	

TABLE 6

CHANGES IN BLOOD PRESSURE, PULSE RATE, RESPIRATION AND TEMPERATURE FOLLOWING ACUTE PARATHION POISONING (SAME CASE AS SHOWN IN TABLE 5)

Date	Time	Blood Pressure	Pulse Rate	Temperature	Respiration
7-28-55	2:30 p.m.	240/140	170	100	35
	3:00	160/120	155		
	4:00	130/80	128		28
	8:30	110/76	120	99.4	24
7-29-55	8:00 a.m.	130/70	72	99.4	22
7-30-55	8:00 a.m.	130/70	60	98.6	14

TABLE 7

CHANGES IN SERUM ELECTROLYTE VALUES, HEMATOCRIT AND SERUM CREATININE IN PATIENT FOLLOWING SEVERE PARATHION POISONING

Date	Na	K	Cl	P.P.	Hematocrit	Creat. mg%	PO4 mg%
7-28-55	153	4.55	101.3	7.17*	49.8*	0.66*	6.6*
7-29-55	154.2	4.15	107.8	7.89		1.5*	5.5*
7-30-55	150	4.0	105.5	7.32	46.3	1.5	4.6
8- 2-55	151	4.65	102.3	6.86	45.5	1.0	3.2
8-10-55	147.5	4.1	104.2	7.2	44.5	0.3	3.1
8-24-55	147.5	4.15	105.9	7.55	54.5	0.9	3.1
9-14-55	144	4.3	104.2	6.5	45	1.4	3.7
10-12-55	148.5	4.7	108.7	6.35	44.5	0.5	3.3

* Done in Greeley.

TABLE 8

ELECTROPHORETIC PATTERN IN PATIENT FOLLOWING ACUTE PARATHION POISONING

	7-30-55	8-2-55	8-10-55	10-22-55	Normal
Albumin	77%	76%	76%	65.4%	70.8%
Alpha 1 globulin	2%	2%	2%	3.2%	2.7%
Alpha 2 globulin	7%	7%	6.5%	9%	5.7%
Beta globulin	5%	6%	6%	9.7%	8.3%
Gamma globulin	9%	9%	9.5%	12.7%	12.6%

gins to fail. The pupils dilate after having been markedly contracted, circulation fails. Respiration ceases and the heart stops.

Oddly enough, in most cases, there are no marked changes at autopsy. The morbid pathology resembles that seen in asphyxia. The diaphragm may be collapsed and somewhat ischemic. The upper respiratory tract and trachea may be filled with a thick viscid mucus. There is usually spasm of the small bronchiolar vessels; there may be a small pleural effusion; the mucosa will be dark and engorged. The right ventricle is usually distended and the left ventricle is empty and there may be petechial hemorrhages in the brain stem, particularly in the medullary region. The brain is usually normal except for those patients who have had severe convulsions before they were seen or were suspected to have had severe convulsions. In these cases, small petechiae may be seen in the medullary portion of the brain.

The important thing is that we can do something for these people. The airway must be maintained, which means if they are quiet it may be possible to use an endo-

TABLE 9

BLOOD CHEMISTRY DETERMINATIONS

Date	Time	Urine Total cc	Chloride MEq/L	Chloride Total	Sodium MEq/L	Sodium Total	Potassium MEq/L	Potassium Total	Phosphate Mg%	Phosphate gm/24 hr.	Creatinine Mg%	Creatinine gm/24 hr.
7-28 to	7:00 p.m.											
7-29-55	7:00 a.m.	359	125.8	45.2	131.3	47.0	137.5	49.4	124.9	.448	275	.988
	7:00 a.m.											
7-29-55	7:00 a.m.	725	49.8	36.1	36.25	26.3	53.75	38.9	85.4	.619	245	1.775
	7:00 a.m.											
7-30-55	7:00 a.m.	586	100.1	58.7	40.0	23.4	116.2	68.1	112	.656	255	1.494
7-31 to	7:00 a.m.											
8- 1-55	7:00 a.m.	690	81.5	56.2	31.25	21.5	112.7	77.8	194	.133	305	2.101
8- 1 to	7:00 a.m.											
8- 2-55	7:00 a.m.	660	100.6	66.4	98.8	65.2	87.0	57.4	174	.115	245	1.615
8- 9 to	7:00 a.m.											
8-10-55	7:00 a.m.	210	89.2	18.73	106.3	22.3	125.0	26.23	193	.0405	325	.683
	7:00 p.m.											
9-14-55	7:00 a.m.	325	260	84.5	260	84.5	60.7	19.72			230	.748

There were no significant changes in serum sodium, potassium, or chlorides. In the first twelve hours the hematocrit as well as serum phosphorus was elevated and there was indication of increased creatinine excretion in the first twenty-four hours.

TABLE 10

17 KETOSTEROID AND CORTICOID EXCRETION IN THE URINE OF PATIENT FOLLOWING ACUTE PARATHION POISONING

Date	Time	Volume	17 Ketosteroids	Corticoids	Creatinine
7-28 to 7-29-55	7:00 p.m. 7:00 a.m.	359	25.2	23.6	1154*
7-29 to 7-30-55	7:00 a.m. 7:00 a.m.	725	23.4	12	1086
7-30 to 7-31-55	7:00 a.m. 7:00 a.m.	786	16	8.7	1011
7-31 to 8- 1-55	7:00 a.m. 7:00 a.m.	690	18.7	7.3	1301
8- 1 to 8- 2-55	7:00 a.m. 7:00 a.m.	660	19.4	10.6	1248

* 12-hour sample.

tracheal tube or airway. However, it would be impossible to place an endotracheal tube in a convulsing patient. It may even require an emergency tracheotomy (particularly if salivation is profuse), because maintenance of a patent airway is essential to life.

Ordinary resuscitation equipment is not adequate for severe casualties because the machines do not permit building up positive pressure high enough to overcome the initial resistance to airflow in such patients. Recent modifications of commercial resuscitation equipment allow positive pressure at higher initial pressures to be utilized on a positive volume delivery basis and should prove quite adequate for field and shipboard use.

Another item under development is a resuscitation attachment for existing gas masks for use in a contaminated atmosphere. This mask-to-mask resuscitator is now under development and it is hoped that it will be available soon to the services.

There have been recent developments in the drugs used for therapy. The most promising candidates at the moment are called oximes. Two examples of such are PAM (pyridine-2-aldoxime methiodide) and DAM (diacetyl monoxime). Experiments indicate that they are capable of reversing neuromuscular block and reactivating cholinesterase which are of therapeutic importance. These compounds, however, react too slowly to be of value if used alone. Atropine is still the standard drug for treatment but it is hoped that compounds such as the oximes may prove to be valuable adjuncts to therapy.

TABLE 11

CHANGES IN BLOOD COAGULATION TESTS IN PATIENT FOLLOWING ACUTE PARATHION POISONING

	7-28	8-2
Recalcification time	Normal	Normal
Prothrombin time	Normal	Prolonged
Prothrombin time 10% plasma	Decreased	Prolonged
Factor VII	Normal	Normal
Prothrombin Consumption	Decreased	Decreased
Thrombin time	Prolonged	Decreased
Fibrinolysis	Negative	Negative

Biological Warfare and Its Defense*

By
LeRoy D. Fothergill, M.D.
Fort Detrick, Frederick, Maryland

SINCE any enemy nation might be expected to use all the weapons in his arsenal, it would follow that he would give serious consideration to biological warfare (BW). Because of this possibility it is incumbent upon each of us to become fully acquainted with the nature of BW.

By way of definition, biological warfare is the intentional use of living microorganisms or their toxic products for the purpose of destroying or reducing the military effectiveness of man. Man may also be injured secondarily by damage to his food crops or domestic animals. The military objective, of course, is to reduce the will or capability to wage war.

It has sometimes been said that BW is public health practice and procedure in reverse. This is an erroneous conception. BW is the deliberate use of natural disease agencies whose inherent potential has been exploited by scientific research and development resulting in the production of BW weapons systems.

Military campaigns and troop concentrations have always provided a fertile field for naturally occurring epidemic disease. Infectious disease has often been the critical factor in the outcome of a military campaign. Bubonic plague was said to have stopped the Crusaders at the very gates of Jerusalem. Dysentery probably caused more causalties in Napoleon's Grand Army than enemy firearms. Typhoid fever and the dysenteries played no favorites among the opposing forces in the Civil War, the Boer War and the Spanish American War. The new science of bacteriology was in its infancy during the latter two wars. Even during World War I, infectious disease was a controlling factor in some campaigns. It is quite clear that typhus fever prevented the Germans from carrying through with their Balkan campaign. In spite of all our modern sanitation and preventive medicine, infectious disease contributed a large share to the cost and difficulty in World War II. Malaria ranked high as an enemy, both in the Mediterranean and in the Southwest Pacific, and scrub typhus caused some 7,000 casualties in the latter area. And finally, it seems only yesterday that enteric infections, Japanese B encephalitis and hemorrhagic fever were bedeviling us in the Korean War.

In the past a number of crude, unscientific and purely local efforts had been made to utilize infectious disease for military purposes. Alexander attempted such exploitation by catapulting the bodies of dead men and animals over the walls of besieged cities. It is reported that smallpox was started successfully among the American Indians during the French and Indian War by distributing blankets, contaminated with purulent smallpox material, among these natives. In World War I the Germans infected horses with glanders that were consigned from this country to the Roumanian Cavalry. During World War II a number of units of the German Occupation Forces, particularly in Eastern Europe, were said to have been the target of local sabotage efforts with bacteriological agents.

All of these efforts were, of course, small, local, makeshift, and unorganized with respect to centralized control and direction. It was not until early in World War II that an officially planned program was devoted to research and development in biological warfare. This has continued to the present time

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as a recognized activity of the Department of Defense. Responsibility for carrying out a program was delegated to the Department of the Army which, in turn, assigned the operational responsibility to the Army Chemical Corps. The major portion of the research and development is conducted at Fort Detrick in Frederick, Maryland. Close liaison is maintained with other Federal agencies having defensive responsibilities including the Federal Civil Defense Agency, the U. S. Public Health Service, the Food and Drug Administration and the Department of Agriculture. That a program of research and development continues in permanent facilities constructed for the purpose can be considered as recognition of the potential of the weapon and thus of the defensive problems which we must be prepared to meet.

Biological Warfare is considered to be primarily a strategic weapon which makes it a particular defensive problem for civilian population centers. The major reason for this is that it has no quick-kill effect. The incubation period of infectious disease plus a variable period of illness even before a lethal effect, render this weapon unsuitable for hand-to-hand encounter. A man can be an effective fighting machine throughout the incubation period of most infectious diseases. Thus, an enemy would probably consider this weapon as primarily suited for attack on static population centers such as large cities and thus our principal concern is with civil defense. There is little point at the moment in considering how it may be used against troops.

An important operational procedure in BW for an enemy would be to create an aerosol or cloud of agent over the target area. This fundamental concept has stimulated much basic research concerning the behavior of biologic particulates, the pathogenesis of respiratory infections, the medical management of such diseases and defense against their occurrence.

The importance of particle size in such aerosols has been recognized. The natural anatomical and physiological defensive features of the upper respiratory tract such as the turbinates of the nose and the cilia of the trachea and larger bronchi are capable of impinging out the larger particles to which we are ordinarily exposed in our daily existence. Very small particles, however, in a size range of 1 to 4 microns are capable of passing these impinging barriers and entering the alveolar bed of the lungs. This area is highly susceptible to infection. The entrance and retention of infectious particles in the alveoli amounts almost to an intratissue inoculation.

In considering BW defense, it is well to know that there are a number of critical micrometeorological parameters which must be met for an aerosol to exhibit optimum effect. Generally, bright sunlight is rapidly destructive for living microorganisms suspended in air. There are optimal humidity requirements for various agents when airborne. Neutral or inversion meteorological conditions are necessary for a cloud to travel along the surface. It will rise during lapse conditions. There are, of course, certain times during the 24-hour daily cycle when most of these conditions will be met. This is important in gas warfare also. Moreover, the importance of these meteorological conditions has long been recognized in connection with certain natural phenomena such as the occurrence and persistence of smog over an area.

Certain other properties of small particles, in addition to those already mentioned in connection with penetration of the respiratory tract, are noteworthy in defense considerations. The smaller the particle the further it will travel downwind before settling out. An aerosol of such small particles diffuses through structures in much the same manner as a gas; a property of considerable importance in connection with certain defensive considerations.

A number of unique medical problems might be created when man is exposed to an infectious agent through the respiratory route rather than by the natural portal of entry. Some agents have been shown to be much more toxic or infectious to experimental animals exposed to aerosols of optimum particle size than by the natural portal. Botulinal toxin, for example, is several

thousand-fold more toxic by this route than when given per os. In some instances a different clinical disease picture may result from this route of exposure, making diagnosis difficult. In tularemia produced by aerosol exposure, one would not expect to find the classical ulcer of "rabbit fever" on a finger.

There are a number of agents that an enemy might select from the several classes of microorganisms (bacteria, viruses, rickettsiae, fungi, or toxic products of certain organisms). There are, however, certain general characteristics that should be met in making a selection.

An enemy would obviously choose an agent that is believed to be highly infectious. Agents that are known to cause frequent infections among laboratory workers such as those causing Q fever, tularemia, brucellosis, glanders, coccidioidomycosis, etc., belong in this category.

An agent would likely be selected which would possess sufficient viability to meet realistic minimal logistic requirements. It is, obviously, a proper goal of research to improve on this property. In this connection it should be capable of being disseminated without excessive destruction. Moreover, it should not be so fastidious in its growth requirements as to make production on a militarily significant scale improbable.

An aggressor would seek minimal naturally acquired or artificially induced immunity in a target population. A solid immunity is the one effective circumstance whereby attack by a specific agent can be neutralized. It must be remembered, however, that there are many agents for which there is no solid immunity and a partial or lowgrade immunity may be broken by an appropriate dose of agent.

There is a broad spectrum of agents from which selection for a specified military purpose might be made. An enemy might choose an acutely debilitating agent, a chronic disease producer or one causing a high rate of lethality.

It is possible that certain mutational forms may be produced such as drug resistant strains. Mutants may be developed with changes in biochemical properties that are of importance in identification. All these considerations are of critical importance in considering defense and medical management.

One point needs serious emphasis. The likelihood of creating an entirely new agent of unique virulence or new disease-producing capability is extremely remote. Even the remarkable genetic progress made in producing bacterial transformation in recent years does not warrant deviation from this opinion at the present time.

There are certain general considerations in connection with BW agents that merit some discussion.

Biological agents are, of course, highly host-specific. They do not destroy physical structures as is true of high explosives. This may be of overriding importance in considering military objectives.

One must be unremitting in emphasizing that there is no secrecy concerning the agents which might be included in an overall BW arsenal. Only certain agents will meet the general and specific BW requirements. Both we and any potential enemy know them. This is not like inventing or rather synthesizing a new chemical poison. One frequently hears it said, "If we only knew what agents our potential enemies were working on we would know what to defend ourselves against." This platitudinous statement is parroted ad nauseam. This is the kind of statement that is made by an ostrich before burying his head in the sand. A more appropriate conjecture would be to ask ourselves, "What are we doing about it? Are we doing enough?"

The question of epidemic disease merits some discussion. Actually, only a limited effort has been devoted to this problem in the research and development program. Some of the bitterest critics of BW have assumed that the only potential would be in the establishment of epidemics. They then point out that with mankind's present lack of knowledge of the factors concerned in the rise and fall of epidemics, it is unlikely that a planned episode could be initiated. They argue further (and somewhat contradictorily) that our

knowledge and resources in preventive medicine would make it possible to control such an outbreak of disease. We agree with this in general and this is why this approach to BW defense has not been given major attention in the program. One can charitably hope that such critics never have to breathe air laden with an infectious agent!

Our main concern is what an enemy may accomplish in the initial attack on a target. This, of course, does not eliminate from consideration for this purpose agents that are associated naturally with epidemic disease. A hypothetical example will illustrate this point. Let us assume that it would be possible for an enemy to create an aerosol of the causative agent of epidemic typhus (*Rickettsia prowazwki*) over City A and that a large number of cases of typhus fever resulted therefrom. No epidemic was initiated nor was one expected because the population in City A was not lousy. Lousiness is a prerequisite for epidemic typhus. In this case, then, the military objective was accomplished with an epidemic agent solely through the results accomplished by the initial attack. This was done with full knowledge that there would be no epidemic. On the other hand, a similar attack might have been made on City B whose population was known to be lousy. One might expect some spread of the disease in this case resulting in increased effectiveness of the attack.

The great inherent potency of BW agents is due to their capacity to multiply when successfully implanted in a susceptible host.

Biological agents are, of course, suitable for delivery through enemy sabotage which imposes many problems in defense. One can let one's imagination run wild in this regard. One might mention a few obvious areas—however, of great importance. The air conditioning and ventilating systems of large buildings are obvious targets. America is rapidly becoming a nation that uses processed, precooked and yes! even predigested foods. This is an enormous industry that is subject to sabotage. One must include the preparation of soft drinks and the processing of milk and milk products. Huge industries are involved also in the production of biological products, drugs, and cosmetics which are liable to this type of attack. These few major areas have been mentioned since sabotage in them would be far-reaching in its consequences. Furthermore, all are subject to prophylactic defensive action.

Our major defensive problems, of course, are concerned with the possibility of overt military delivery of biological agents from appropriate disseminating devices. It should be no more difficult to deliver such devices than other weapons. The same delivery vehicles—whether they be airplanes, submarines or guided missiles—should be usable. If it is possible for an enemy to put an atomic bomb on a city, it should be equally possible to put a cloud of biological agent over that city. This points up an enormously important civil defense problem which will be considered in more detail later.

Another aspect of biological warfare is the possible use of biological agents for the reduction of, or destruction of, agricultural crops and domestic animals—in other words, antifood biological warfare.

The importance of food, particularly during war, needs no emphasis. Actually food production is of major concern to most countries even during peacetime. We are one of the few countries in the unusual position of finding overproduction a major problem.

In all wars, moreover, military efforts have been devoted to the destruction of the enemy's food supply. The grain-laden freighter was as much a prize for a submarine as a ship loaded with tanks.

Biological warfare may find its greatest effectiveness when used for anticrop and antianimal purposes. Contrary to the case in anti-personnel BW, the epiphytotic and epizootic potential of anticrop or antianimal agents would be exploited by an enemy. Anti-food biological warfare could play a decisive role in any war that was not decided with push-button speed. This country is in a favorable defensive position in anticrop warfare. Our cropping is very diversified and biological agents are, or course, specific for particular crops. Those countries that are

generally dependent, for agronomic, climatic or traditional reasons, on a single crop are the most vulnerable.

It is hoped that this general consideration of biological warfare will serve as a useful framework around which one can build one's defensive thinking and planning. Let us now consider some of the general features of this problem.

It may seem trite, but nevertheless it is worthwhile to emphasize, that there is a vast amount of medical knowledge in existence which can be useful. In this sense BW is not completely new. We have had long medical and epidemiological experience with infectious diseases. We have a vast public health effort in being at the federal, state and local levels. Our sanitary engineering practices and methods for disease control are at a high level of efficiency. All of these are positive values in our defensive bank account which can be drawn upon in an emergency and would be of great value.

One must not be complacent, however, and be lulled into thinking that BW would be rendered ineffective by these aids. This is not so. These techniques have been developed over the years for dealing with *naturally* occurring infectious disease. The military exploitation of massive amounts of highly infectious agents through unusual portals of entry creates new problems for which these procedures were not designed and against which no experience has been developed. One might illustrate this point. Adequate means have been developed, for example, for delivering potable water to all inhabitants in a community. We now take this for granted. On the other hand, there is no known public health procedures that will deliver sterile air to all inhabitants of a city. Defense against a massive biological aerosol is a new and critically serious problem.

It is obvious, of course, that medical defensive planning for a community should not be limited to preparation for BW. BW will not cause extensive burns, broken bones or radiation sickness. All defensive planning should be thoroughly integrated and should be designed to give the maximum practical relief for whatever disaster might befall. For the moment, however, we will consider BW defense only.

One of the most critical problems is detection or early warning. Biological clouds have no characteristics detectable by the senses. They are invisible, odorless and tasteless—in contrast to certain gas clouds. Even if they possessed an odor, the odor-detecting sniff might result in a sufficient dose to produce an infection.

As is always true, an initial surprise attack will, of course, be the most serious. Later attacks may be suspected by their general characteristics—such as possible noise of a disseminating device, recognition of a dud device and finally the realization that something has been delivered that is not a conventional weapon.

The importance of such immediate detection and warning is that it may permit certain defensive actions of a physical nature. The gas mask, for example, affords excellent protection to the respiratory tract if it can be put on in time. Early warning may also permit timely entrance into collective shelters should they exist. It is possible to design quite efficient structures for this purpose.

Some progress is being made in the development of instrumentation for rapidly detecting unusual concentrations of particulate matter in the air.

A closely related problem is rapid specific identification of the particular agent. The ordinary biological methods, employed in the diagnostic laboratory are far too slow. Identification of viruses is especially tedious. This problem is important in that if the agent can be identified in time, it may permit certain medical prophylactic procedures before the onset of illness. Progress is being made in this field, but much remains to be done. One might suggest at this time that any laboratory conducting research to improve and speed up identification of disease organisms will be making a significant contribution to the defense effort.

Another defense activity is decontamination or "clean-up" after an attack. Much technical knowledge has been developed in

this field and is available to defense authorities. One might point out that most of the effort has been devoted to developing procedures for specific and isolated use. One could not hope to decontaminate an entire city. Indeed, this would not be necessary. Sunlight and time are remarkable decontaminants. One may have urgent need, however, for decontaminating specific equipment, structures or isolated areas.

The most important of all defensive procedures is prophylaxis by active biological immunization. A number of effective immunizing materials are already available for some infectious diseases. On the other hand, there are a number of potential BW agents against which there is no method of immunization. There are several cases where the value of the immunizing material continues to be questionable or at least where improvement must be sought throught research.

One must encourage all research possible that is devoted to the development of new or improving existing methods of active immunization. All ancillary research dealing with host-parasite relationships will have positive defense value. Moreover, all such research has great peacetime value. It will not be totally consumed in an engine of war.

The administrative problems in connection with the immunization of large populations against a number of agents are enormous. This, too, is an area where research should be fruitful because simplified techniques for rapid, mass immunization are essential. Considerable effort is being devoted to the development of combine or multiple vaccines; an effort that is being rewarded with some success.

There is also the very large field of passive biologic and antibiotic prophylaxis, i.e., the use of antimicrobic agents after exposure to the agent but before the onset of illness. This problem merits some detailed discussion.

The use of immune sera, even if effective, would be extremely limited in BW. The production and distribution of the enormous quantities required would be very difficult, if not totally unrealistic. On the other hand, the desirability of having some stocks in hand for limited and specialized use should be kept in mind.

More detailed discussion is warranted in connection with the possible prophylactic use of antibiotics and chemotherapeutic drugs. The importance of this has been over-played in the past. It is essential, therefore, to point out many of the shortcomings of this form of prophylaxis as a guide to future effort.

On several occasions, articles have appeared expounding the thesis that our enormous antibiotic industry has made biological warfare obsolete. This is, of course, ridiculous for a variety of reasons. To permit such reasoning to guide our preparation for defense would be suicidal.

There are many potential BW agents for which there is no known effective antibiotic or drug. Among these may be mentioned *Coccidioides immitis, Histoplasma capsulatum* and, more importantly from a BW point of view, most of the filtrable viruses.

While we have some antibiotics that exhibit a considerable spectrum of activity, there are others whose greatest value is in use against a specific agent. For prophylactic BW defense after an attack, it would mean, therefore having the right antibiotic in right amount at the right place at the right time—a logistic requirement that is almost impossible to meet. Even these considerations may be academic, moreover, when it is realized that the use of drug resistant strains of agents is not an unlikely possibility.

In some cases it has been shown that giving an antibiotic immediately after exposure merely prolongs the incubation period without preventing infection. Our British colleagues have recently reported that monkeys exposed to lethal respiratory doses of anthrax spores could be treated for several weeks with an antibiotic and would show no signs of infection during that time. When the drug was withdrawn the animals promptly developed fatal anthrax.

One might conclude this discussion of strictly medical prophylaxis by emphasizing that the greatest hope for defense against BW would be the development of effective

methods for producing active immunity. Passive prophylaxis with antibiotics and drugs may have limited value. This procedure must not, however, be regarded as a panacea that will render BW obsolete.

There are some additional activities that should be mentioned in connection with BW defense.

Maintaining an adequate epidemiologic intelligence service and warning network is of great importance. An unusual occurrence of disease in a particular location may be the first warning of a BW attack. The prompt recognition and reporting of such episodes is essential.

It is important to have available the services of an organized network of laboratories having the qualifications and equipment necessary for the recognition and identification of unusuál agents. Such services are needed particularly in the virus field. The personnel in such laboratories should be trained and indoctrinated in those features of BW that may have a special bearing on their responsibilities. This should include training in the use of new detection devices and new procedures for more rapid identification of agents.

There must, of course, be adequate planning for optimum emergency hospital and medical service. Each community must plan the details in this connection.

Our defensive considerations may be concluded with a few words concerning prevention of sabotage. A careful vulnerability study should be made of all sensitive industries and facilities to determine the most likely spots for attack. There should be proper policing and guarding of such spots. Loyal employees should be indoctrinated to the point of being able to augment such guarding. Adequate chlorination of water supplies should be assured. Air conditioning and ventilating systems of sensitive buildings should be appropriately protected. And, finally, one must not neglect the simple but very effective techniques of heating or boiling food products.

PLEDGE OF ALLEGIANCE TO THE FLAG

"I pledge allegiance to the Flag of the United States of America and to the Republic for which it stands; one nation under God indivisible, with liberty and justice for all."

Status Report on Adenoviruses and Asian Influenza*

By

M. R. HILLEMAN, *Ph.D.*†

THE acute respiratory illnesses of man present a major medical problem to the Armed Forces in time of peace and more prominently in time of war. Two respiratory viruses stand out beyond all others in their importance in military medicine. The first of these, the adenoviruses, are of greatest importance as the most frequent cause for hospitalization for respiratory illness of the new recruit in the Armed Forces. The other is influenza virus which causes epidemics at periodic intervals in all personnel categories in the services. For my talk I wish to focus on the adenoviruses and on influenza.

ADENOVIRUSES

The discovery in 1953 of the adenoviruses represents the most significant advance in our knowledge of etiology of respiratory disease since the discovery of the human influenza viruses. The discovery of the adenoviruses was a sequel to the renaissance of tissue culture and its application to the respiratory disease problem.

Shortly following the initial recovery of the adenoviruses, it was shown that these viruses are a family of distinct immunological types as determined by the neutralization technique and that they share a common group-specific "soluble" complement fixing antigen. It was also found that these viruses are a principal cause of acute respiratory illness among newly recruited military personnel.

CLINICAL PICTURE

The adenoviruses attack all segments of the respiratory tract in man from the nose to the lungs and the conjunctivae in addition. The pathology induced is basically cellular damage with inflammation and hypertrophy of the corresponding lymphatic tissue. The clinical picture seen in any individual patient is related to the particular segments of the respiratory tract involved and to the degree of damage.

Most patients with adenovirus-caused respiratory illness present a basic syndrome of fever with pharyngitis and severe cough. This may be accompanied by a granular conjunctivitis, by coryza, by exudate on the hypertrophic lymphatic tissue of the throat, lymphadenopathy of the head and neck region, and lower respiratory tract involvement including tracheobronchitis, bronchiolitis and atypical pneumonia.

Constitutional symptoms including headache, malaise and myalgia are commonly present. Among hospital cases in the Army, usually 10% to 15% of patients develop a pneumonitis which resolves completely within 30 days. The mean maximum temperature in hospital cases runs around 103°F and the average length of hospital stay is 5 to 8 days.

The respiratory illnesses cause by adenoviruses fall into the general category of the febrile catarrhs. The Navy would know this as "cat fever". More specifically, however, the illnesses caused by these agents fall into the syndromes of undifferentiated acute respiratory disease (or ARD), non-streptococcal exudative pharyngitis, atypical pneumonia unassociated with cold agglutinins and pharyngo-conjunctival fever.

EPIDEMIOLOGY

Extensive investigation of adenovirus infections in military populations have shown quite clearly that this is a highly frequent disease of new recruits and a relatively infrequent cause of illness in the cadre or

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† Formerly: Chief, Department of Respiratory Diseases, Walter Reed Army Institute of Research, Washington, D.C. Present address: Director of Virus Research, Merck, Sharpe & Dohme, West Point, Pa.

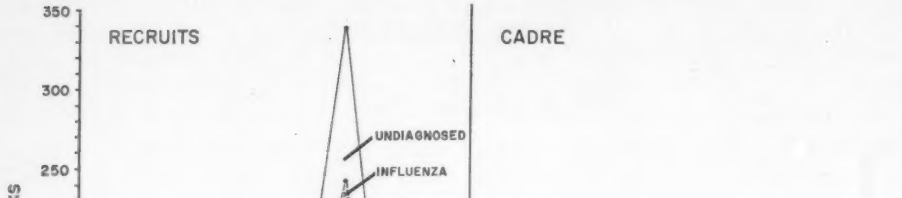

FIG. 1. Estimated hospital admission rates, by serological diagnosis, among recruits and cadre, Fort Dix, N.J., June 1954-May 1955. (From Hilleman et al. *Am. J. Hyg.*, 66:29, 1957.)

"seasoned" personnel. The cause for this disparity is not known definitively but experience with the virus in basic training resulting in immunity seems to be at least one important factor in the defense against the disease in the cadre. The importance of adenovirus-caused disease as an important military medical problem is illustrated in Figure 1 which presents the attack rates for total respiratory illness and for adenovirus-caused respiratory illness, specifically, at a typical recruit training base, Fort Dix, N.J., over a full one year period.

The usual seasonal pattern of occurrence of respiratory illness with highest attack rates in the winter and lowest rates in the summer will be noted. The great bulk of the admissions for respiratory illness in recruits was caused by adenovirus. This disease accounts for most of the excess respiratory illness above the summer level. Influenza was a relatively unimportant cause for respiratory illness during the period of the study shown and the bulk of non-adenovirus cases were undiagnosed.

The relatively low attack rate for adenovirus-caused respiratory illness among cadre is in striking contrast to the recruits. Respiratory illness, in general, is a far less problem among such "seasoned" persons.

To illustrate further the importance of adenovirus infections in recruits, it may be noted that 10,000 hospital cases of respiratory disease were reported among recruits for the year at Fort Dix. Of these about 6,000 or 60% were shown to be caused by adenovirus. During the one year period shown, roughly 60,000 men were trained at Fort Dix. Thus 6,000 of the 60,000 trainees —1 in every 10 men—were hospitalized around 5-8 days with an acute respiratory illness. The importance of this is emphasized in the cost for time loss, the cost for hospital or dispensary care, inefficiency of operation, plus cost for repeat training. The greatest impact of the disease, of course, is during

time of mobilization for war. The findings to date in other Army and Navy recruit bases are generally consistent with these findings at Fort Dix.

Vaccine

The adaptation of the adenoviruses to growth in tissue culture of monkey kidney made feasible the development of an adenovirus vaccine. Two adenovirus vaccines have been developed and tested to date. The vaccine developed in our laboratories at the Walter Reed Army Institute of Research is a bivalent material and contains types 4 and 7 virus, the two types which account for the vast majority of cases in military recruits. The vaccine developed by Huebner and others at the National Institutes of Health is a trivalent preparation which contains type 3 adenovirus as well as 4 and 7. Studies to date have indicated such low incidence of type 3 adenovirus in military populations as to obviate any real need for the type 3 component in the vaccine. Additionally, the bivalent types 4 and 7 vaccine induces a level of antibody against heterologous type 3 virus roughly comparable to the homologous agents. For both the bivalent and trivalent vaccines, the virus is cultivated in monkey kidney cells in tissue cultures maintained with serum-free mixture 199. The virus is inactivated with formalin.

Extensive evaluations of both the bivalent and trivalent vaccines have been carried out in field trials which prove beyond all doubt the high degree of efficacy of adenovirus vaccine in preventing illnesses caused by type 4 or type 7 adenovirus. The results of these trials to date have shown that both vaccines effected an overall reduction in cases of febrile acute respiratory illness, all causes, of from 55% to 81%. While these results are striking in themselves, the real test for efficacy of the vaccine is in its effect on adenovirus cases in the epidemic, specifically. The bivalent vaccine developed and tested by our group effected a 90% to 98% reduction in such cases. The early preliminary data kindly furnished by Dr. Harry Rose covering the 1957 study at Fort Dix indicate that the effectiveness of the trivalent vaccine in preventing adenovirus-caused respiratory illness was roughly of the same order of magnitude, i.e., 83%, as the bivalent product.

It is clearly evident that a vaccine has been developed which shows promise for essential eradication of adenovirus-caused respiratory disease as an important medical problem in the Armed Forces. The savings expected in the U. S. Army for elimination of time loss and medical care alone through use of the vaccine has been estimated to be in excess of 7.5 million dollars per year. It is contemplated that general immunization of new recruits will be implemented in the Armed Forces sometime during the latter part of 1958. Regulations governing commercial manufacture of the vaccine have been published in the Federal Register and the product has been licensed officially by the Department of Health, Education and Welfare.

Studies of antibody response in man to the vaccine have indicated that the jet gun is a highly efficient method for vaccine administration and may be considered for routine use for this purpose. The antibody resulting from vaccination seems to be retained well for at least a year. Studies of vaccines prepared to date have generally shown that most are of borderline potency insofar as maximal conversion from the susceptible to the immune state is concerned. This points up the importance of obtaining vaccines of maximal potency and of minimizing virus loss from the vaccine attendant with fine filtration of the live virus pool prior to inactivation with formalin.

Use of Adenovirus Vaccine

The great importance of adenovirus-caused respiratory disease in new recruits and the plans for general use of the vaccine in such persons has already been indicated. The situation with adult civilians, as with the cadre, is quite different. In striking contrast to their behavior in military recruit populations, the adenoviruses presently appear responsible for only a fraction of the

respiratory illnesses among adult civilians. Studies of various segments of the civilian population including families, college students, university students, university employees, and selected cases of acute respiratory illness from hospitals or private practice have shown very low attack rates for adenovirus-caused respiratory disease. It cannot be stated that the findings in these limited segments of the population are necessarily illustrative of the entire spectrum of the population. However, until such time that there is shown a definitive need for vaccine in a particular civilian population group, the use of the vaccine is not warranted.

The potential need for adenovirus vaccine among children seems somewhat greater than among adult civilians but the question cannot be answered definitively at present because of the lack of information concerning attack rates for illnesses caused by these agents. The few recorded outbreaks of type 3 adenovirus infections among children in camps are insufficient to warrant general use of the vaccine among children. The adenovirus disease situation as it applies to very young children or infants is virtually unknown at present and it is in this area that much research investigation needs to be carried out. The problem of whether an adenovirus vaccine is needed for children, what types of adenovirus should be included in the vaccine, and just how effective such vaccine would be in preventing disease are all important research problems for the future. Finally, in any consideration of the employment of adenovirus vaccine, it is important to remember that there is no evidence to relate adenovirus infection to the common cold. Indeed, the bivalent adenovirus vaccine has proved quite ineffective in preventing the mild febrile or non-febrile acute respiratory illnesses which fall into the general category of the common cold and which are caused by agents other than the advenoviruses.

Influenza

Influenza remains one of the last great plagues of mankind. Yet I doubt that the disease would receive the great amount of attention paid it were it not for the threat of another pandemic such as occurred in 1918-1919 and which is estimated to have taken the lives of 25 million persons throughout the world.

Virus Types

There are 3 basic types of influenza virus called types A, B and C. The separation of types is based on the antigenic composition of the viruses. There is no antigenic crossing between types.

All 3 types of virus cause much the same clinical disease. Yet there is much difference in the epidemiologic picture. Type A influenza is the really important type causing major widespread epidemics at intervals of every few years. The type B epidemics are far less frequent and the cases tend to be more sporadic. Type C epidemics occur primarily in children and appear to induce a lasting immunity in the individuals infected.

This paper will focus attention on influenza A for it is the most important type and because of the pandemic of influenza A which is currently with us.

Virus Anatomy and Strain Variation

In understanding the epidemiology of influenza A it is well to consider the anatomy of the virus particle itself. The influenza virus particle may be thought of as a spherical "skin" which encloses the nucleoprotein constituents. The nucleoprotein is currently believed to be the "soluble" antigen of the virus which is readily detectable by the complement-fixation method. It is common to all strains of influenza A and appears to bear no relationship to immunity from the disease. The viral "skin," on the other hand, bears a variety of diverse antigens. These antigens are the hemagglutinins of the virus and are the components concerned directly in immunity. The composition of the virus in relation to these specific antigens located on the cell surface make for the specific differences and account for the great antigenic variation which influenza virus manifests.

The existence of and the importance of strain variation and antigenic change in hu-

man influenza virus have been recognized since shortly following the first discovery of human influenza in 1933. The significance of such variation was forcibly driven home in the influenza vaccine trials of 1947. It was at this time that the variant type A prime virus first appeared in the U. S. and the old formula vaccine was without significant effect.

During the following years much work was done to understand strain variation in influenza and to investigate its mechanism. It has been generally concluded, based on the experience to the present, that major antigenic changes occur only at infrequent intervals of perhaps a decade or more. The 1947 occurrence of type A prime virus and the appearance in April of this year of the Asian virus are examples of such major change. The Asian influenza antigenic shift is certainly the most marked in our total experience with influenza viruses. During the years intervening between major shifts, there is usually a gradual and progressive change from year to year.

The mechanism for the antigenic change seems to lie in the ability of the virus to vary antigenically coupled with the driving force of selection imposed by the necessity of the virus to survive in the partially immune host population. We have here a situation which bears some comparison to a horse race. As the human herd gains in experience with a particular influenza virus, the general immunity level is raised and it becomes more and more difficult for the virus to make effective contact with new susceptibles. Those viruses exhibiting least fit, antigenically, with the prevalent antibody will have the best chance for survival, the host immunity providing thereby the mechanism for selection. This leads to continuous and progressive change. Ultimately, herd immunity appears to catch up with virus variation, and at such times, the new and different or really altered virus mutant is favored. This virus then becomes predominant during the ensuing period.

Because of the continuing change in the virus, it is necessary to alter the formula of the vaccine at periodic intervals to bring it up to date with the prevalent strains. During the periods between major changes, introduction of a new virus into the vaccine every few years seems to be adequate. The real problem, however, is to get advance notice on the really different antigenic mutant. It is extremely important, therefore, to maintain constant vigilance for the new and different virus so as to apprehend it when it first appears before its more widespread occurrence in the human population.

During the period from 1953 to 1957, there has been relatively little influenza A throughout the world. Likewise, the general level of antibody against most of the A prime viruses had become very high. These facts suggested that conditions had been achieved which would favor a major antigenic change in the virus and such change was being watched for. The New York Times report of April 17, 1957 of a large scale outbreak of influenza in Hong Kong provided the warning signal which led to the early recovery and identification of the virus from the Far East and permitted the manufacture of vaccine sufficiently in advance of the pandemic in the United States and Europe to provide protection in at least part of the population.

Epidemiology

All evidence to date indicates that the Asian virus was born in China and caused widespread epidemics throughout that nation during March 1957. The virus apparently was carried from Communist China to Hong Kong with a group of refugees. There the epidemic spread rapidly to involve at least 10% of the population. From Hong Kong the epidemic spread throughout the Far East, Southeast Asia, the Philippines and Formosa. The disease then extended westward across Asia and India to the Middle East and to South America. There was also a spread to the west involving Japan, Hawaii and the United States. The first laboratory-proved epidemic of influenza in the United States was in the occurrence of the disease aboard the naval vessels of the Atlantic fleet working out of Newport, Rhode Island. Soon

other outbreaks were identified in the International Church Conference at Grinnel, Iowa, in the Boy Scout Jamboree at Valley Forge, in the Pacific fleet at San Diego, and in several youth groups and in military installations in California. The further spread in the U. S. A. to the present has been characterized by a widespread occurrence of localized epidemics throughout the nation.

The natural occurrence of influenza epidemics has been during the winter months of the year and it was out of character for the disease to be epidemic during the warm months. In the present instance, however, the course of events was as might be expected for it has been shown that the antigenic alteration of the virus was so great as to leave the population with essentially no herd immunity. Under such conditions, the virus experienced little difficulty in finding new susceptibles and spread rapidly. It is my own belief, as well as that of others, that the characteristic spread of influenza during the winter is principally a reflection of the changed living habits of the population which tends to be driven indoors where there is more close contact between persons and greater chance for effective contact. Where there is a relatively high level of immunity in the population, only very close contact makes possible the finding of new susceptibles.

The rapid spread of the virus in epidemics throughout Asia and the Far East, in contrast to the population of the United States and Western Europe, appeared to lie in the lower socioeconomic level in these areas and the greater crowding. Additionally, school continues throughout the summer months in many areas of the Orient. The epidemic occurrence in the United States and Europe, during the summer, were characteristically aboard ships, at youth meetings, on trains, in recruit camps and such where there was close contact and crowding. The first widespread epidemics in the United States were in Louisiana late last summer where school convened early to permit the students to get some of their education out of the way before dismissal in the Fall to participate in the harvest of the crops. With increasing time and cooler weather, there has been progressively greater spread of the disease in the U. S. A. and this is expected to continue. It has been estimated that more than a million cases of the disease may have occurred thus far.

Clinical

Much has been said concerning the mildness of the present disease and many persons have ventured the opinion that there is little cause for concern. Yet, it is well to remember that the 1918 pandemic also began as a mild disease in the spring and culminated in the unprecedented and highly fatal epidemics which spread throughout the world during the ensuing fall and winter. I call these facts to your attention not with the intent of causing alarm, but to emphasize the need for continuing surveillance and watchfulness where influenza is concerned.

Certainly the disease thus far has been mild and characteristic clinically of the mild epidemic influenza of past years. The onset is usually abrupt with headache, fever, chills and myalgia. Localizing signs or symptoms include sore throat, mild coryza, dry cough, tracheitis or rarely pneumonitis may be present. The identifying feature of the disease in adults is the predominance in severity of constitutional symptoms of fever, malaise, chills, headache and especially myalgia or generalized aching, in contrast to the mild local symptoms. The myalgia, so prominent in adults, may be very mild or absent in children. Recovery is usual in 4 to 5 days.

All epidemics of influenza are characterized by an excess mortality for all causes, especially in the aged or infirm. The deaths in some may be attributable to the virus itself, in others to pneumonic complications resulting from secondary bacterial infection and in still others to the stress compounded onto an infirmity such as cardiac failure or inadequate kidney function.

As of 8 October 1957, there were reported a total of 21 influenza-associated deaths in the United States. Laboratory proof of influenza was established in only a few of the cases. Death in most persons was ascribed to pneu-

monic complications, usually bacterial but primarily viral in some. Heart involvement including coronary occlusion or acute myocarditis was reported in a few cases. Encephalitis and brain stem involvement were believed to be important in 3 of the cases, though detailed proof was lacking.

Considerable interest was aroused in the sharp increase in death rate which attended the Philippine outbreak of last spring and the Chilean epidemic last July and August during the winter months in the Southern Hemisphere. In both locations, deaths were greatest in the very young and the very aged. In interpreting the data from Chile and the Philippines, Dr. Davenport has pointed out that respiratory illness is normally the third leading cause of death in the Philippines and the first cause of death in Chile. Dr. Davenport believes that the crowding, malnutrition, and relative non-availability of adequate medical care have unquestionably contributed to the severe impact of the epidemic in both countries. Thus, the Chilean and Philippine experience should not be considered a foreboding of what may occur here. Instead, Dr. Davenport is guessing that our winter experience will resemble more closely that of the Australian winter in which the attack rates ran about 10-15%. The disease was mild and the bacterial complications were infrequent. What ultimately happens must await the experience itself.

Vaccine

Before closing, I should like to pass on to a brief review of the Asian influenza vaccine situation. The general experience since the first successful tests of influenza vaccine in 1943 has been that vaccine, which is up to date in its strain composition, may be expected to effect at least a 70% reduction in the incidence of the disease. It can only be hoped that the present Asian vaccine will prove this effective.

During the early period of Asian influenza vaccine production last summer, the yield of virus in embryonated eggs was very low and it was decided that a vaccine containing 200 CCA units of virus was about the best that could be expected. We, and others, immediately began studies in human volunteers to determine the antibody response to vaccination with materials of this approximate strength.

Table 1

Preliminary Analysis of Results of Titration of Asian Influenza Vaccine in Human Volunteers with Findings Expressed as Arithmetic Mean Titer

Vaccine (CCA units per dose)	Number of Volunteers	Arithmetic mean HI titer following:	
		First dose	Second dose
1000	16	111*	149
750	14	60	73
500	14	43	67
250	14	20	28
125	10	19	26

Vaccine doses given 3 weeks apart. Bleedings taken 2 weeks after injection of vaccine.

* Numbers are reciprocals of mean titers.

We found that roughly 90% of persons who received the vaccine developed measurable antibody against the virus following a single subcutaneous dose of vaccine. A few additional persons developed antibody following the second injection given 2 weeks later. There was no effect, either beneficial or adverse, of simultaneous introduction of the old-formula polyvalent A, A prime, B vaccine insofar as Asian antibody was concerned.

In further studies summarized in Table 1, we measured the antibody response to graded strengths of influenza vaccine from the 1000 CCA unit to the 125 unit level. The arithmetic mean titer, 2 weeks following a first injection was elevated with increasing vaccine dose. In spite of the great difference in mean titers obtained, the rate of conversion of individuals from the negative to the positive status was far more uniform. This varied at random from 80 to 100% irrespective of dosage in the 250 unit or greater range. There was some slight further advantage in administering a second dose of vaccine.

We do not know specifically what circulat-

ing antibody level actually constitutes immunity in Asian influenza but guess, based on past experience, that this lies in the titer range from 1:20 to 1:40. It would appear then that the 200 CCA unit vaccine presently used induces a level of immunity in the lower part of what may be considered to be an acceptable range. It is expected that potency level of the vaccine will be increased, eventually, to provide a margin of benefit. (This was increased to 400 CCA on 1 Dec., 1957)

Now, just as in war, the winning team is determined on the battlefield, so also the effectiveness of a vaccine is proved in its evaluation under field conditions of the disease. Only scanty information is available presently of the probable effect of the Asian vaccine in preventing the disease. However, in studies in which there was a reasonable control group or in human volunteer studies, a roughly 45-60% reduction in total respiratory disease, all causes, has been indicated. The reduction in Asian influenza, specifically, should be far greater. The results of further field trials are eagerly awaited.

Much has been said in recent weeks about the substitution of the 0.1 cc dermal dose for the full 1 cc amount given subcutaneously. It has been the general experience in the past with polyvalent vaccine that the antibody response to the 0.1 cc intracutaneous injection was roughly comparable with the full 1 cc dose given subcutaneously. In a limited series of persons given Asian vaccine in our laboratory this finding held true in that the percentage of conversions and the mean antibody levels following 0.1 cc intracutaneous injection were almost as great as those obtained by the 1 cc inoculations. However, (1) because of the uncertainties of actual intradermal inoculation in mass immunization programs and (2) because of the fact that we have no data from field trials of proof of efficacy of vaccine introduced dermally, the subcutaneous route is to be preferred for routine use. The intracutaneous injection should be reserved for those situations in which the urgent need for vaccination exceeds the available supply of vaccine. What constitutes a situation in which expediency must be served must be left to the judgement of the individual physician or administrator. Certainly, the increasing availability of the vaccine will eventually obviate the need for dermal administration and, if desired, persons who originally received vaccine by the dermal route may be given a further 1 cc dose subcutaneously.

The Tuberculosis Control Program for the U. S. Navy*

By

CAPTAIN HUGH G. WHITEHEAD, MC, *U. S. Navy Reserve*†

TUBERCULOSIS among seamen has always been a problem of considerable extent ever since man began to sail in ships. The close and intimate contacts of shipboard life encourage the passage of this insidious disease from one to another, often without the knowledge of its being present. Early in World War II our Navy recognized the advantages of a routine X-ray examination of the chest for the discovery of tuberculosis and pioneered in the development of our modern photofluorographic chest X-ray equipment. This permitted the chest X-ray examination of many millions of individuals and the subsequent elimination from the service of many thousands who might be considered as a potential or actual source of tuberculous infection. From this there naturally evolved the tuberculosis control program for the Navy. Let me review briefly what this program entails.

In 1941 the Navy embarked upon a tuberculosis control program the purpose of which was to reduce to a minimum. the incidence of tuberculosis in the naval service. Development of the program through the years has resulted in the following: (1) provision of roentgenographic examinations of the chest of both uniformed and civilian personnel at the time of entering service, at annual intervals when practicable thereafter, and at the time of leaving service; (2) tuberculin skin testing of all Navy and Marine Corps recruits, and a special study of medical and dental personnel, where the incidence of tuberculosis is almost twice that of the remainder of the Navy; (3) the isolation, study, and treatment of personnel suspected of having active pulmonary tuberculosis at diagnostic and treatment centers established at the U. S. Naval Hospital, St. Albans, Long Island, New York, and the U. S. Naval Hospital, San Diego, California.

At the present time there are 102 photofluorographic (70MM) units distributed at strategic locations in the United States and over-seas, including 11 mobile units and two transportable units, to accomplish the roentgenological surveys. Over a million chest X-rays of service personnel and approximately a half million X-rays of civilian personnel were taken last year. The roentgenographic examinations of the chest are most frequently made by the photofluorographic technique (70MM) for convenience and economy. When the photofluorogram reveals suspicious findings, the person is reexamined by means of a 14 × 17 inch roentgenogram of the chest. If this second examination confirms the suspicious findings, the person is referred to a naval hospital for consultation and admission if advised, in the case of service personnel. Civilian personnel are referred to their private physician or to the Public Health Service (See tables 1 and 2).

A routine roentgenographic examination of the chest is required of all Navy and Marine Corps personnel as a part of the physical examination to determine fitness for enlistment appointment, or active duty, for separation or release to inactive duty, and at annual intervals while on active duty.

The Navy also employs many thousands of civilians who sometimes work intimately with our service personnel and become a possible source of infection. A routine roent-

The opinions or assertions contained herein are the private ones of the author and are not to be construed as reflecting the views of the Navy Department or the naval service at large.

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† 1201 North Calvert St., Baltimore, Maryland.

TABLE 1

PHOTOFLUOROGRAPHIC STUDIES ON U. S. NAVY PERSONNEL

Year	No. PFGS	No. TBC Suspects	Rate per 10,000	No. Non-TBC Suspects	Rate per 10,000
1945	2,489,000	4,766	19.2	1,702	6.8
1946	3,055,612	4,131	13.5	1,334	4.4
1947	495,515	464	13.0	417	8.4
1948	563,269	610	10.8	355	6.4
1949	502,346	455	9.5	413	8.2
1950	776,690	686	8.8	584	7.5
1951	911,940	1,231	13.4	1,337	14.6
1952	1,041,039	1,338	12.9	1,104	10.6
1953	1,043,300	883	8.4	1,386	12.3
1954	1,263,808	711	5.6	1,114	8.8

genographic examination of the chest is required of civilians as a part of the physical examination to determine fitness for employment in the naval shore establishment, for separation from such employment, and at annual intervals during employment under the regulations of the Civil Service Commission as outlined in NCPI 88.

When a civilian employee is found to have active pulmonary tuberculosis, he is advised to seek treatment. He is also advised to arrange for leave of absence in order to obtain treatment unless he prefers to resign, or if appropriate he may be advised to apply for disability retirement. Leave of absence may be periodically extended until the individual's recovery is considered sufficient to warrant his return to work. If he refuses to secure treatment and refuses to take leave of absence for such purposes, he is separated for disability in accordance with the Navy Civilian Personnel Instructions.

In order to eliminate another possible source of infection those dependents of naval personnel who are fifteen years old or older are encouraged to have roentgenographic examinations of the chest at the same time and place as naval personnel.

All photofluorographic film is forwarded to the Bureau of Medicine and Surgery for review and filing. This review reveals an additional ten per cent of individuals with suspicious chest X-rays requiring further clinical study. The review also furnishes information which permits maintenance of uniform professional and technical standards in the photofluorographic examination. After completion of the review the photofluorographic film is forwarded to the U. S. Naval Records Management Center, Garden City, Long Island, New York, for permanent filing. These films are readily available and serve as aids to clinicians in determining the age and character of a pulmonary lesion, and to Boards of Medical Survey, Retiring Boards, Adjudication Boards, and also for determining the line of duty status and disabilities attributed to diseases of the chest.

As a further means of detection of hidden disease, all recruits, Navy and Marine Corps, are given tuberculin skin tests. Those found to have positive reactions are further scrutinized and re-examined to discover possible sources of infection.

In a previous study in 1949 the incidence rate for tuberculosis (2.2/1000) among Hospital Corpsmen, was almost twice that of the rest of our naval population. It was then deemed advisable that tuberculin tests be made on all medical and dental personnel under the age of thirty-five first reporting to a naval hospital for staff duty, and also on those over age thirty-five if they so desire. Those whose tests are "negative" or "doubtful" are retested at annual intervals while on duty in the hospital as long as the reactions remain "negative" or "doubtful." Appropriate physical and laboratory examinations

TABLE 2

PHOTOFLUOROGRAPHIC STUDIES ON CIVILIAN PERSONNEL, U. S. NAVY

Year	No. PFGS	No. TBC Suspects	Rate per 10,000	No. Non-TBC Suspects	Rate per 10,000
1948	182,279	1,100	60.3	514	28.1
1949	213,442	856	40.1	672	31.5
1950	318,104	984	30.9	924	29.0
1951	382,334	1,726	45.1	1,239	32.4
1952	432,695	2,012	46.3	1,431	33.7
1953	409,215	1,102	29.2	933	22.7
1954	384,724	838	21.7	985	25.6

TABLE 3

ANNUAL REPORT (BY NUMBER) OF FIRST TUBERCULIN TEST AFTER ENTERING NAVAL SERVICE—1953

Tuberculin Reaction	Total	MC	DC	NC	MSC	Hosp. Corps		Other
						Med.	Dent.	
1. Total Individuals Tested for the First Time with 0.0001 Mgm. Ppd.	3624	362	37	626	38	2437	71	53
2. No. with Negative Reactions	2647	175	21	379	19	1975	44	34
3. No. with Doubtful Reactions	66	5	0	22	0	37	2	0
4. No. with One Plus Reactions	322	48	3	87	4	162	12	6
5. No. with Two Plus Reactions	314	86	5	69	6	129	9	10
6. No. with Three Plus Reactions	191	32	6	43	5	99	3	3
7. No. with Four Plus Reactions	84	16	2	26	4	35	1	0

are made of personnel whose tests become positive and arrangement is made for continued medical observation for at least two years.

During fiscal year 1953, tuberculin tests were made on 3,615 previously untested individuals serving on staffs of naval hospitals. The "single test" purified protein derivative tuberculin was used in most instances, and contained 0.0001 miligrams of P.P.D. Of the 3,624 individuals tested, 2,647 or 73.0% were found to be negative. This high rate of negative reactors emphasizes the large reservoir of susceptible persons who are apt to have intimate contact with infectious cases (tables 3 and 4).

During the same period, 4,567 of those medical department personnel who had given negative reactions within the year were retested with the "single test" dose. In this group, it was found that 392, or 8.5% had converted to a positive tuberculin reaction. If it is considered that the so-called "doubtful reactions" may be a latent manifestation of tuberculin sensitivity, then another 61 must be added to this group of converted individuals (tables 5 and 6).

The resulting total of 9.9% represents those of the 4,567 medical department personnel who had converted from a negative reaction to a positive or doubtful tuberculin reaction during fiscal year 1953. This percentage is considerably lower than that found in many studies of hospital personnel throughout the nation. In the latter studies conversion rates were noted to be as high as 39.2%.

Even though the conversion rate for medical department personnel seems to be comparatively low, it is considered advisable to continue the search for unknown cases of tuberculosis. Vigilance can be facilitated by

TABLE 4

ANNUAL REPORT (BY PERCENT) OF FIRST TUBERCULIN TEST AFTER ENTERING NAVAL SERVICE—1953

Tuberculin Reaction	Total	MC	DC	NC	MSC	Hosp. Corps		Other
						Med.	Dent.	
1. Total Individuals Tested for the First Time with 0.0001 Mgm. Ppd.	3624 100.0%							
2. No. with Negative Reactions	73.0	48.3	56.8	60.5	50.0	81.0	61.9	64.1
3. No. with Doubtful Reactions	1.8	1.4	0.0	3.5	0.0	1.5	2.8	0.0
4. No. with One Plus Reactions	8.9	13.3	8.1	13.9	10.5	6.6	16.9	11.3
5. No. with Two Plus Reactions	8.7	23.8	13.5	11.0	15.8	5.2	12.6	18.9
6. No. with Three Plus Reactions	5.3	8.8	16.2	6.9	13.2	4.0	4.1	5.7
7. No. with Four Plus Reactions	2.3	4.4	5.4	4.2	10.5	1.4	1.4	0.0

TABLE 5

ANNUAL TUBERCULIN RETESTING REPORT—1953 (BY NUMBER)

	Tuberculin Reaction	Total	MC	DC	NC	MSC	Hosp. Corps		Other
							Med.	Dent.	
	1. Total Individuals Tested with 0.0001 Mgm. Ppd.	4567	250	25	488	42	3619	112	31
	2. No. with Negative Reactions	4114	209	19	427	37	3287	106	29
	3. No. with Doubtful Reactions	61	5	0	7	0	48	1	0
	4. No. with One Plus Reactions	134	8	2	19	1	99	3	2
Conversions	5. No. with Two Plus Reactions	128	15	2	19	1	90	1	0
Conversions	6. No. with Three Plus Reactions	78	7	2	9	1	59	0	0
Conversions	7. No. with Four Plus Reactions	52	6	0	7	2	36	1	0

the routine chest examination of every hospital admission by the photofluorographic method, where the incidence of tuberculosis is found to be four times that of the general population, and also by the continued periodic retesting of those negative reactors who by virtue of their duties are caring for potentially active tuberculosis patients.

In order to attain greater effectiveness, the case finding program is co-ordinated by the Tuberculosis Control Officer of the Preventive Medicine Division at the Bureau of Medicine and Surgery to insure that all persons with abnormal roentgenographic findings in the chest are further investigated. A course in photofluorography is maintained at the Bureau of Medicine and Surgery to instruct interested medical officers in the operation of the equipment and interpretation of the films in order that such trained physicians may be assigned to key locations, and to insure a uniformly effective program throughout the Navy with recognition of pathology "on the spot."

By such methods persons who have tuberculosis or other disqualifying defects of the chest are excluded from the service. Prompt discovery and isolation of personnel suffering from pulmonary tuberculosis in the communicable form aids in prevention of the spread of disease within the service. Early treatment of those individuals with incipient or minimal tuberculosis, who almost invariably are asymptomatic at that stage, also aids in the reduction of hospitalization required, and mortality of the disease. These methods also permit those persons who have conditions of questionable clinical significance within the chest to be followed by serial X-rays and other studies.

Although the primary purpose of this program is integrated with the nation-wide

TABLE 6

ANNUAL TUBERCULIN RETESTING REPORT—1953 (BY PERCENT)

	Tuberculin Reaction	Total	MC	DC	NC	MSC	Hosp. Corps		Other
							Med.	Dent.	
	1. Total Individuals Retested with 0.001 Mgm. Ppd.	4567 100.0%							
	2. No. with Negative Reactions	90.0	83.6	76.0	87.5	88.0	90.8	94.7	93.5
	3. No. with Doubtful Reactions	1.3	2.0	0.0	1.4	0.0	1.3	0.8	0.0
	4. No. with One Plus Reactions	2.9	3.2	8.0	3.8	2.3	2.7	2.6	6.4
Conversions	5. No. with Two Plus Reactions	2.8	6.0	8.0	3.8	2.3	2.4	0.8	0.0
Conversions	6. No. with Three Plus Reactions	1.7	2.8	8.0	1.8	2.3	1.6	0.0	0.0
Conversions	7. No. with Four Plus Reactions	1.1	2.4	0.0	1.4	4.7	0.9	0.8	0.0

effort to eradicate pulmonary tuberculosis, an additional dividend is obtained by the early recognition of other types of cardio-respiratory pathology which are of increasing importance today. Early recognition of pulmonary and cardiac disease in its latent or minimal stage helps to insure against the loss of trained personnel, and reduces the length of costly medical care and rehabilitation.

During 1951 there were approximately 2,100 individuals referred for further clinical study as a result of a photofluorographic examination. An attempt was made to evaluate the results of these individuals so studied. From the reports received there were only 975 cases sufficiently complete for a preliminary evaluation to be made. Here are some of the impressions so far obtained.

Of the 975 cases, 341 (35%) were finally classified in Class I Group A of the diagnostic nomenclature (tuberculous). One-third of this group were classified as pulmonary tuberculosis, active minimal, and another third were called pulmonary infiltration, cause undetermined.

Of the total group evaluated (92) were Caucasian, and (32%) were under 20 years of age. Of those classified as tuberculous (31%) had less than one month of service and only 6 had 20 years of service or more.

Other conditions determined from the evaluation of the 975 cases mentioned above were 4 cases of coccidioidomycosis, 10 cases of histoplasmosis, 17 cases of sarcoidosis, 109 cases of pulmonary fibrosis, 30 cases of bronchiectasis, and 3 cases of cystic disease of the lung. There were also 63 cases of primary typical pneumonia noted in this group.

Of the 341 definitely classified as tuberculous, a positive sputum for acid-fast bacilli was obtained in only 38% of the cases and a positive gastric washing was obtained in only 33%. This does not include the results of guinea pig inoculations, however, so that the apparent discrepancy between the findings of the sputum smear and the gastric washing should not be considered too seriously.

As to skin tests on so-called tuberculous individuals it is to be noted that 81% were positive on the first strength tuberculin test, and 6.9 were positive only to P.P.D.-2. Of those individuals tested for histoplasmin 21.5% were found to be positive and 15% were found to be positive to coccidiodin.

From an administrative and a clinical point of view it is interesting to note that of the 975 individuals admitted to this evaluation, 98.5% were found to have suspicious findings on a purely routine examination.

Of the group classified as tuberculous or Class I A, 44.6% were determined to have had their condition prior to enlistment or appointment. Disposition of these individuals was as follows:

a. 35% were returned to duty, but 72 of these individuals were placed under the diagnosis pulmonary infiltration, cause undetermined.

b. 60% were I.S., but this group also included 37 individuals who were classified as pulmonary infiltration, cause undetermined.

As to when these suspicious findings were noted: of the 975 evaluated in this study 53% were found on the initial examination. In the tuberculous group (341 cases) 36.5% were noted in the initial examination.

In the tuberculosis group a rather high percentage admitted to a known contact with tuberculosis (38%) but only 5.6% gave any past history of prior known infection.

When we consider the length of service of these tuberculous individuals we find that for every 4.7 years of service each individual has had only 2.8 examinations. So we can hardly say that we are obtaining the 100% annual coverage that we should like to have.

The following is a report of the photofluorographic chest X-ray survey conducted at Puget Sound Naval Shipyard during 1953. A total of 16,351 photofluorographic films were taken:

There were made 1,273 re-examinations with 14 × 17 inch films for suspected pathologic changes. Two hundred and nine (209) clinical studies were conducted, resulting in 19 persons being hospitalized for active tuberculosis, and 6 other individuals who underwent thorocotomy for such condi-

tions as bronchogenic carcinoma, dermoid cyst, hamartoma, Boeck's sarcoid, and one non-specific coin lesion. Other findings of clinical importance included:

Cardiac enlargement	11
Dilation of the thoracic aorta	18
Hilar and mediastinal masses	11
Pneumonitis	5
Pulmonary fibrosis—severe	9
Aortic aneurysm	4
Pulmonary cysts	3
Atelactasis	4
Diaphragmatic Hernia	1
Aneurysmal dilation of pulmonary artery	1
Calcification of the pericardium	1
Calcified aortic plaques	1
Bronchiectasis	2
Adencarcinoma, left bronchus	1
Intrathoracic thyroid	1
	73

Along with the discovery of such a wide variety of clinical entities, a most important aspect of the survey has been the excellent liaison established between the medical department of the Puget Sound Naval Shipyard and the local public health agency. This public health agency handled all aspects of required hospitalization, all sputum and gastric studies, and the examination of all the outside shipyard contacts. A like liaison has been established with public health departments of the Seattle-Tacoma area for employees living there.

A most vital fact is that over 33% of the local county's population is employed at the shipyard, placing this naval installation in a very enviable position regarding tuberculosis control. Up to the present time 19 active cases of pulmonary tuberculosis have been found in this survey and hospitalized, and 3 currently are under continued study, giving a ratio of approximately 1 case per 1,000 examined. In a discussion with public health authorities concerning this ratio the general consensus is that the yard frequency is no higher than the rest of the county, but that a diligent X-ray program has brought to light innumerable cases which might otherwise have escaped detection.

The significance of the tuberculosis control program of the Navy is found in the following:

a. It is an integral part of the nation-wide effort to eradicate pulmonary tuberculosis and the Navy is making a great contribution.

b. Economically the program is sound because it helps to insure against the loss to the service of expensively trained men. Also the early discovery of tuberculosis in its latent or minimal stages reduces the length of costly medical care and the early rehabilitation of those who have developed the disease.

Tuberculosis—Its Diagnosis and Control*

By

COLONEL EUGENE C. JACOBS, *Medical Corps, U. S. Army*†

SEVERAL decades ago it was believed that tuberculosis could be controlled in the military services by preventing the entry into the services of individuals having the disease. Following this doctrine in World Wars I and II, the military services rejected between 0.5 and 3 per cent of all men examined because of active tuberculosis. In spite of these high rejection rates, medical care for individuals developing active tuberculosis in the military services during these two wars cost the United States Government some $3,000,000,000.

Today this disease continues to present an epidemiological problem of tremendous importance to the military services. In the age group from 17 to 37 years, which we might well call the Military Age Group, tuberculosis still remains the leading cause of death from disease. Since World War II, some 1,000 to 1,500 new cases of active tuberculosis have been found each year in the Army, and have cost the Government more than $100,000,000 annually. It has been estimated that the medical care of a single case of tuberculosis developed in the military services costs the Government between $60,000 and $70,000.

Because of the prolonged disability suffered by the victims, because of the tremendous burden placed upon the military and veteran's hospitals, because of the great expense to the Treasury of the United States, and because of the large loss of manpower, which in the event of an all-out war, would be the Nation's most critical resource, it is not difficult to conclude that tuberculosis is an especially important disease in the military services.

I would like to present several reasons why the Armed Forces should have a positive and aggressive program to diagnose and to control tuberculosis.

A fact that I would like to emphasize is that tuberculosis is an avascular disease. The avascularity begins with the formation of the tubercle and increases as the disease progresses. It is due to two things: thrombosis and endarteritis obliterans of the involved arteries. It results in ischemic necrosis of the involved tissues. The host in order to prevent the spread of the disease, further increases the avascularity by encapsulating the lesion with fibrous tissue. As the tuberculous infection progresses, the avascularity, the necrosis and the fibrous encapsulation become more and more complete. These pathological changes constitute definite barriers, which not only interfere with the nutrition of the involved areas, but also impede or prevent chemotherapeutic and antibiotic agents from reaching the contained tubercle bacilli. Even though the antituberculous agents may be both bacteriostatic and bacteriocidal in the blood stream and in normal tissues, they are not able to sterilize the more chronic lesions of tuberculosis. Chronic necrosed and fibrosed tuberculosis, even with the present-day antibiotics, remains essentially an irreversible disease.

At this point I would like to ask two questions. Why should we wait until tuberculosis is avascular, necrosed, and fibrosed to treat it? Why not treat it while the tuberculosis is still acute, while it has a relatively good blood supply—in short while it is a reversible disease?

The first requirement we have to meet to treat tuberculosis early, is to be able to diagnose it early.

In the past the diagnosis of tuberculosis has usually been made after the symptoms of

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† Commanding Officer U. S. Army Hospital, Fort Monroe, Va.

the disease have become sufficiently serious to bring the patient to the doctor or the hospital. The diagnosis has depended upon a positive x-ray finding, plus a positive tuberculin test, plus a positive sputum, gastric washing or culture. By the time these criteria have been met, the disease is usually many months old, and most likely in an irreversible stage.

Mass chest x-ray surveys have brought an occasional tuberculous patient to the hospital prior to the development of symptoms, but for the most part, mass x-ray surveys have been a poor approach to tuberculosis control, because the positive radiologic findings lag well behind the onset of the disease.

Actually the quickest and most accurate method to establish the early diagnosis of tuberculosis is by means of the tuberculin test. It has been the basis for the successful eradication of tuberculosis in cattle. For many years it has been used to confirm the diagnosis of tuberculosis in humans. It has stood the test of time. It is a simple test and cheap. It will become more valuable as the control of tuberculosis improves. Its accuracy is close to 100% in experienced hands. The intracutaneous method is preferred.

J. Myers of Minnesota was one of the first to realize the possibility of curing tuberculosis, if it could be diagnosed and treated sufficiently early. He pointed out that "When the individual's tissues first become sensitive to tuberculin and for some time thereafter, the lesions of the primary complexes are small and vascular. In most cases the diagnosis can be made within two months after the bacilli invade the body." He advocated prompt chemotherapy as soon as the individual converts to a positive tuberculin, and prophesied a complete sterilization of the body. He realized that such a program would behoove every physician to determine the tuberculin status of everyone for whom he is responsible. He further stated that "Sterilization of the bodies of those who convert, should prevent tuberculous meningitis, miliary disease and the crippling deformities of bones, joints, etc." Myers has more recently stated that "Evidence is accruing to show that prompt treatment is actually preventing the acute destructive forms of tuberculosis."

While the medical profession is slowly beginning to feel its way in the early treatment of tuberculosis, there are reports of success. (By early treatment of tuberculosis, I mean the treatment of recent converters.)

Dr. Karl Pfuetze, Medical Director for Tuberculosis in the State of Illinois tells me, "We have been treating positive tuberculin converters among our employees for two years now, and no clinical active cases have developed in this group."

Dr. J. Myers, Director of the School of Public Health, University of Minnesota, and Medical Director for Tuberculosis in the State of Minnesota, states that among the recent converters treated "he has two nurses who have reverted to negative tuberculin on drug therapy." He also points out that Dr. John Adams, Chief of Pediatrics at the University of California, Los Angeles, now has a few reverters, as well as the Denver Group.

Finally, I would like to tell you of the interesting experience of Colonel Glascock, Surgeon of Western Area Command in Europe. During the winter of 1956-57, five clinical cases of tuberculosis developed in a finance office in which 73 persons were employed. Seven others had suspicious shadows; three of these later developed clinical tuberculosis. Of the 34 military persons in the office, 17 had positive tuberculin tests and 17 had negative tuberculin tests.

During the following 3 months, 6 of the tuberculin negatives converted to tuberculin positives. These six were treated with streptomycin, PAS, and isoniazid while remaining on active duty. These cases did not develop clinical tuberculosis nor any complications of tuberculosis. These cases did not cost the Government $60,000 to $70,000 each to treat, but nearer $60 or $70 each, and none of them lost time from their duties.

To me, from the dollars and cents point of view as well as a humanitarian point of view, a modern program for the diagnosis

and control of tuberculosis is not only very important but extremely practical. It boils down to the old saying: "A stitch in time saves nine."

In conclusion I would again like to propose the following tuberculosis program for the military services:

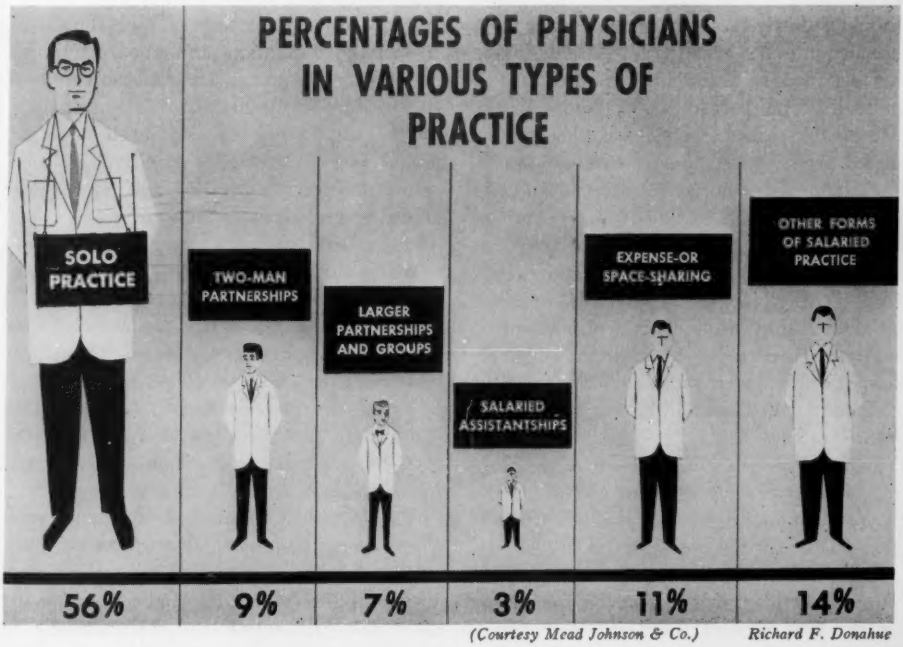
1. Tuberculin tests would be made routinely on all individuals entering the military services, and the result would be recorded upon the individual's Immunization Record as well as his Physical Examination Standard Form 88.

2. Positive reactors would not be accepted for military services until thoroughly studied for possible active or latent tuberculosis. When and if accepted for service, positive reactors would be studied periodically for any evidence of activity of the disease.

3. Negative reactors would be retested on an annual basis, and especially after any suspicious respiratory disease such as pneumonia.

4. Negative reactors, who convert to positive after an illness, or in the interim between periodic testings, would be quickly studied for any evidence of tuberculosis. Such studies should be completed within a matter of hours, not weeks or months. As soon as the physician is satisfied that early tuberculosis exists, approved combinations and doses of chemotherapy would be initiated.

If this proposed program for tuberculosis control is adopted by the Military Services, I firmly believe that tuberculosis can be eradicated from the services, and that millions of dollars can be saved by the Government each year.



(Courtesy Mead Johnson & Co.) *Richard F. Donahue*

Panel on Control of Food and Water Borne Diseases

By

STAFF, NAVY PREVENTIVE MEDICINE UNIT #2, NAVAL BASE, PORTSMOUTH, VIRGINIA*

INTRODUCTION

By

LIEUTENANT CHARLES J. JORDAN, MSC, USN

OUTBREAKS of food borne and water borne diseases continue to be a problem in the Navy. In our discussion, we will consider only the bacterial food and water borne diseases and will not attempt to go into the chemical contamination of food and water. Most outbreaks of food borne diseases are preventable, since the usual cause is failure to observe sanitary procedures, techniques or good personal hygiene habits with which food service personnel should be fairly familiar and which they must practice in every instance while preparing or serving food. In water borne diseases, just as in food borne diseases, many outbreaks are preventable if the personnel are indoctrinated in the proper procedures in handling water. Food and water borne disease can and has crippled ships. There is evidence on record where outbreaks of food and water borne disease have involved the greater portion of the ship's crew, not leaving enough men to handle the ship safely. This is not difficult to understand when you consider the construction of a ship, the crowded conditions and the common facilities used by all ship's personnel. When an outbreak occurs aboard a ship, it usually involves a great number of people—people who become ill from one to several days, depending upon the organism which is responsible for the outbreak.

How does food and water become contaminated with agents responsible for illness? In the case of food, there are several ways in which the agent may enter and cause illness. It may enter by dust carrying bacteria, in insanitary dishes and utensils; hands of food service personnel; coughs and sneezes, and insects. Lt. Davies will go into this more thoroughly in his section of the panel.

Experiences show that more than ½ of all the reported food borne outbreaks are the result of gross carelessness and deficiencies in the messing sanitation or insanitary food preparation and serving. Outbreaks can be prevented by maintenance of high standards in messing sanitation and food handling. Commissary personnel are important in preventing food borne disease. They must realize the importance of refrigeration. They should also remember that uncovered containers of food, especially milk and dairy products, invite contamination from a number of sources including droplet infection.

Water borne disease aboard ship is an ever constant threat and requires constant vigilance in an attempt to prevent any contamination in the water supply system. Our ships travel all over the world. While they travel at sea, they can provide their own water, but when they are anchored in foreign ports, they must obtain water from, many times, questionable sources.

The Naval Medical Department is well aware of the situation and is constantly alert to reduce and eliminate food and water borne diseases. The Bureau of Medicine and Surgery has established Preventive Medicine Units strategically located throughout the world to give assistance to ships in food and water borne outbreaks. More important are the Preventive Medicine measures which pre-

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vent food and water borne disease before they can get started. Preventive Medicine Units give assistance to the ships at sea and to shore establishments in the form of epidemiological teams, training and indoctrination in preventive measures, and one of our more important functions is the providing of laboratory facilities.

I will introduce Lt. Davies who will discuss the food borne diseases.

FOOD BORNE DISEASES

By

LIEUTENANT (JG) J. A. DAVIES, *Medical Service Corps, U. S. Navy*

I SHALL discuss food borne diseases under two headings, the first, intoxications; the second, infections.

First, and probably foremost, under the heading of intoxications are the food borne diseases caused by Micrococcus pyogenes, more commonly known as staphylococcal food infections. Ordinarily, the source of staph food intoxication is a human source. The staph organisms are natural inhabitants of not only skin but of the nasal passages in approximately 20 to 30 per cent of the population. Ordinarily, this organism is transferred by means of custards, processed foods and meats of all sorts. The incubation period for this particular food borne disease is ordinarily 2 to 4 hours, although this is not always the case—it can be seen in less than an hour and sometimes up to 8 hours.

One of the major difficulties in detecting the presence of this organism in food is the fact that it elicits no unpleasant or noticeable odor to any food that it might have infected. This, being an intoxication, need not have the organism alive in the food. The toxin that is produced by the organism is sufficient to cause a manifestation of the symptoms of staphylococcal food intoxication. As far as prevention is concerned, the best measures are proper refrigeration of food prior to serving, adequate heat treatment of the foods to be served, periodic inspections of food handlers and other peoples working around the galley areas who might be handling food from time to time. Education also plays a great part in the prevention of staphylococcal food borne diseases. The food handling personnel should be made aware of the situation and be on the alert for this type thing at all times.

Next on the list is the Clostridium organism—*Clostridium botulinum*—causing botulism. This again is a food intoxication in that the organism in the vegetative state elicits an exotoxin which actually causes the symptom manifestations. There are five types of clostridium botulism, A, B, C, D, and E. A, B, and E are the types that are more commonly found to cause intoxications in human beings. C & D ordinarily are found as causing intoxications in animals. This is a very persistent organism in that it is a spore primarily and therefore can withstand high degrees of temperature as well as long periods of vesication. The source of this particular organism is ordinarily the soil or animal intestinal tract. Generally the transfer of clostridium botulinum occurs through uncooked or inadequately processed foods, and is most commonly seen as a result of home canning procedures that are not adequately carried through. The incubation period here is usually 18 hours to 4 days. The exotoxin produced here does elicit a foul odor to the food product, particularly in acid foods.

Under the infections, I shall deal first with salmonellosis caused by the various Salmonella organisms. This is probably the most frequently seen food infection in the Navy. The source of this infection is feces of carriers as well as transfer directly through carriers. Another source is, of course, from fowl and eggs. The transfer in this instance usually occurs through improper cooking and through carriers. It has, also, been mentioned in literature that cockroaches might very

well be responsible for the spread of salmonellosis, through their contact with rodent feces. Again, as far as prevention and control measures, sanitation is of the utmost importance, care and proper cooking of foods, care that the foods do not stand for extended lengths of time prior to serving, and education among the food handlers.

The next of the infections is shigellosis. This is not too commonly seen in the Navy, although we at the Preventive Medicine Unit do occasionally pick up carriers of Shigella. The source of this organism is ordinarily the feces of infected persons. Again, this organism is ordinarily transferred to food products from other contaminated food products; through water that has been contaminated in one way or another; flies have been implicated in the spread of Shigella. Here again the control measures are: good sanitation practices throughout the galley areas, education among the food handlers, and inspections periodically, as well as a program in fly control.

The third class is the streptococcal infections. This class is one of the less severe food poisonings and one that is not too commonly seen. This at first was thought to be perhaps a toxin producing organism, but on testing was found to be truly an infection. The source of this infection is improperly processed foods; also from milk and water supplies. The incubation period is ordinarily 2 to 18 hours. Again as far as control measures are concerned, sanitation is of the utmost importance.

There are a few other organisms that have from time to time been implicated in food poisoning. I shall not go into all of their characteristics at this time but I might just mention their names. They are the various coliform organisms, the paracolons, the proteus organisms, Clostridium perfringens and Bacillus subtilis.

Further, in trying to control these various food borne diseases, we of the Unit have instituted several projects which we continue throughout the year, one of which is continuing sanitation inspections aboard ships at the ship's request. Another of these control measures is our surveys for carriers. The unit personnel actually go to the ships and survey all food handling personnel for the detection of carriers. We have found in the past that our recovery rate has been somewhere in the vicinity of about 3%. It is our feeling that the elimination of a carrier from the fleet who might possibly be responsible for food borne disease breaking out aboard ship is certainly worth any time and effort that might be involved.

I shall next turn the program over to Mr. Halverson who will discuss the water borne diseases.

WATER BORNE DISEASES

By
Ensign Charles W. Halverson, MSC, USNR

WATER borne diseases are a problem throughout the Armed Forces. Even today, in spite of the control measures that have been instituted, problems still exist in keeping water supplies from becoming contaminated. The problems encountered in the prevention and control of water borne diseases aboard naval vessels for the most part are basically the same as those encountered in shore establishments. However, there are inherent difficulties which are peculiar to Naval vessels and these problems, of course, make the prevention control of water borne disease more difficult.

Now, before going into this, I would like to give a brief run down on some of the disease producing organisms which do contaminate our water supplies. First, there are the salmonella type, the paratyphoid, the various shigella organisms, and the paracolons. Also there are protozoans, namely Entameba histolytica and Giardia lamblia.

The latter I mentioned, of course, is questionable, nevertheless it cannot be overlooked.

The origin of these organisms mentioned, of course, is the human intestinal tract. Now these organisms are transmitted not only by water but it is also found that these are transmitted from person to person. The organisms most frequently found in diarrhea, belong to the Salmonella group.

Now what are the problems that involve or make it possible for the infections to enter the fresh water supplies and cause this diarrhea. First of all, let us see how a ship obtains its potable water. It may obtain its water by making it through distillation of outboard water; it may receive its water by filling its tanks with connections with portable water systems ashore; or it may transfer or receive its water from ship to ship transfer or water barges. Now, in each of these methods there are modes by which disease organisms can enter potable water supplies. One mode of transfer can be cross connections, a cross connection being any physical connection between a potable water supply and a non-potable water supply. For example, should the fire and flushing system be started while there are existing ship to shore connections and the failure to provide a back flow preventive, harbor water could be forced right into the potable water supply of a ship.

About a year ago, this became a very real thing, over at the Naval Base. Members of the Preventive Medicine Unit spent about three days and three nights attempting to get things back into order.

Also, there are other means of contamination in back flow—back siphonage. Cross connections such as in steam tables and galleys aboard ship. Water can be back siphoned into the fresh water supply, thus contaminating it. Another problem is the repair and maintenance of fresh water tanks aboard ships. To do this, of course, personnel have to go through manholes into the tank directly to scrub them out, reline them or whatever is necessary. Now should these tanks be filled again with fresh water and not properly decontaminated by superchlorination, there again is a possibility of contamination.

There is another occasion when a ship is providing its own water by the use of overboard water—most naval vessels operate with a low pressure distilling plant and the temperatures are not high enough to kill bacteria. Should the evaporators be filled too full and the distillation commence, some water can be carried over without being vaporized. This water, of course, contains disease producing organisms.

These are the primary modes of transfer of infectious agents aboard naval vessels. As for prevention, one would be the routine regular bacteriological testing of the ship's water. It is recommended that this be done quarterly; if the ship sticks to this routine, the chance of being disabled by dysentery outbreaks is lessened. Also, another good method is constant chlorination of the water tanks aboard ships. The recommended dosage is 0.2 part per million residual, but this thing, of course, fluctuates from time to time with the various conditions of the water. So there has to be constant supervision of this chlorinating of water.

There is also water system inspection and survey. If this is done routinely, then any cross connections which may exist can be detected and eliminated, before they cause trouble. Lastly but not least, is education and information. Personnel should be properly instructed and trained in the methods of chlorination of water and in making ship to shore connections when they are drawing fresh water supplies. All of these, of course, are sources of contamination, if not properly done.

Before closing, I would like to mention one other subject here and that is the one of questionable etiological agents in dysentery outbreaks aboard ship. This Unit at one time experienced such an incident where two naval vessels were involved. Diarrhea outbreaks occurred aboard. Bacteriological examination of stool cultures, and water samples showed no known pathogens. However, the water supply was polluted due to the presence of coliform organisms. Now,

exactly what caused these enteric outbreaks? It could possibly have been by-products of the bacteria present in the water. It might even possibly have been of virus origin or it might be what we term sewage poisoning. At least, these outbreaks do occur. So it is not always going to be Salmonella, Shigella or an *Entameba histolytica* you are going to find causing you trouble aboard ship.

Now, I would like to introduce Lt. Sanborn, who will discuss laboratory techniques.

LABORATORY PROCEDURES IN FOOD AND WATER BORNE DISEASES

By

LIEUTENANT (JG) W. R. SANBORN, MSC, USN

WE, OF the Preventive Medicine Unit # 2, feel that laboratory procedures in the field of enteric bacteriology are important and even essential to the intelligent diagnosis of diarrheal disease, with particular reference, of course, to the water and food borne illnesses of this nature. Primarily, an intelligent diagnostic approach on the basis of laboratory procedure as well as other findings prevents considerable waste of treatment, especially in the field of antibiotics, and they provide, of course, an adequate reason for proper treatment. Furthermore, they point the way to the effective control of epidemics.

The standard fermentation series which has been used for years in enteric bacteria work is certainly still of value in research laboratories where a lot of time is available, but in the event of an outbreak, survey, or the general type of work which a relatively small laboratory such as a shipboard laboratory or dispensary happens to do, these techniques become much too cumbersome. Also, they are very often too complicated to read and interpret for the corpsman doing the job. Often results are inconclusive by the older fermentation series methods with fermentations being variable within a certain enteric group.

Today, new methods and new media are being developed. There is a great deal of work done on a new composite media and on short methods, methods which can well be used in small laboratories aboard ship or in a dispensary which, unfortunately, for the most part are not being used. Primarily, they are not being used because in our experience with dealing with laboratory technicians aboard ships, these new methods are not being taught to the laboratory technician. Apparently, they are not being used very extensively in the Navy.

Now, let us consider for a few moments, composite techniques. In 1953, Sanders and Okabe described a method, whereby they could quite adequately identify a Salmonella or a Shigella using only four test tubes in only 48 hours. Kohmer, in 1954, described a two tube technique, cutting down Sanders' work by about half. Where short laboratory procedures are concerned, Sanders, in 1953, working with the U. S. Army in Korea, described a screening technique for the field laboratory, utilizing again composite media.

Some of these composite media we might mention here. Preventive Medicine Unit No. 2 has been using one of these composite techniques with a great deal of success for about five years now, making modifications on it as our needs demanded. Currently, we have a medium for the diagnosis of cultures picked from the primary plating medium which combines tests for the characteristic motility of the organism and mannitol fermentation.

Singer, in 1951, developed a medium which would demonstrate both an organism's actions on the splitting of urea and indol production from the tryptones in the medium. A booster medium has been developed which is one of the media which Sanders, work-

ing with the U. S. Army in Japan has utilized, employing ingredients which will give the reactions to sucrose, lactose, and indol all in one tube. Of course, if we have worked in a bacteriology laboratory at all, we are all rather familiar with the K. I. A. (Kliger's Iron Agar) slant, which demonstrates the action of bacteria on dextrose and lactose and also shows the production of hydrogen sulfide. Triple sugar iron agar has been developed by adding one more sugar to that same medium. Thus, in one tube, in one operation, we read the diagnostic reactions of four different characteristics of the enteric bacterium being studied. Recently, in a paper received by this Unit, a new medium has been described by Rappaport in Israel, called UMAGIS. In one tube, by one inoculation, Rappaport can demonstrate reaction to urea's splitting acid and gas production from mannitol, indol production, hydrogen sulphide production, and the slant may be used as a source of bacteria for serologic grouping and confirmation techniques. The medium is wholly autoclavable, and it is an extremely easily used medium, well adapted to the small laboratory which we find aboard ships and easily readable by a simple identification chart.

While it would seem that shortened bacteriological procedures are currently not being routinely made known to laboratory technicians going into the field, simple, quick bacteriological procedures for small laboratories are available. These diagnostic procedures can make it much easier for a medical officer to make an adequate and accurate diagnosis.

Serology in enteric bacteriology can be quite complicated, but on the other hand, there are also simplified procedures in the serological diagnosis of enteric bacteria which are available. The screening sera available on the medical stock list include both the Salmonella and the Shigella groups. This, of course, is the only proper way to prove the identity of Salmonella or Shigella, and it certainly should be used after preliminary biochemical identification. We feel, however, that this serological work should be done by a specialized laboratory, i.e., Preventive Medicine Units and hospital laboratories, but the laboratory technician in the field can do the preliminary biochemical testing in an outbreak of enteric disease with which he is concerned. Biochemical and serological confirmation can then be done in more specialized laboratories. Complete final identification by serological studies of these bacteria can be done at relative leisure by the specialized centers such as the Naval Medical Research Institute at Bethesda. Screening relieves these centers of a lot of useless bacteriology so that they may do more significant work in positive identification and over-all study of the organisms which have caused outbreaks.

Most methods, as was pointed out, are too cumbersome for the small laboratory, but we have seen that there are media and methods which can be adapted to work adequately during an outbreak. To this end, Preventive Medicine Unit No. 2, in cooperation with and at the request of medical officers aboard ships, has set up 16 enteric laboratories aboard ships in the Atlantic Fleet, utilizing a very short method prepared by Preventive Medicine Unit No. 2 and utilizing Preventive Medicine Unit No. 2 as a final confirmation laboratory. In several instances, there have been outbreaks which have been adequately diagnosed by the bacteriological technique given the laboratory technicians aboard these ships. Now, we do not claim in these shortened biochemical procedures without serological confirmation, that the answer is definitive for Salmonella, Shigella, or other enteric pathogens, but we do think that in the event of an outbreak, it gives the medical officer an extremely adequate answer for intelligent diagnosis, treatment, and curtailment of an outbreak which occurs aboard his ship. Thus, we combine the doctor's clinical diagnosis, symptomotology, laboratory results, and epidemiology to a very adequate whole answer to a problem in enteric disease.

The field of rapid enteric bacteriology has become more and more important to this adequate diagnosis, and the ideal would cer-

tainly be a single isolation medium, preferably a plating medium which would be completely selective to the enterics or pathogens. This has not yet been achieved, but certain media have come very close to it. However, with adjustment and calculated actions, some methods such as the one we have given shipboard laboratories in the Atlantic Fleet give tentative evidence for treatment action by a physician in the space of slightly less than 24 hours and a reasonable confirmation within 48 hours.

This can also be done serologically by picking colonies directly from the isolation plates rather than using biochemical diagnostic methods, but this method has certain drawbacks, particularly along the lines of expense. The serum for use is tremendously expensive for this type of operation.

At Preventive Medicine Unit # 2, the short technique which we have been using involves a four tube series for identifying bacteria from the isolation plate. We use Salmonella—Shigella Agar for primary isolation of both these groups. Salmonella—Shigella Agar is not too exclusive of members of either group.

We have found in obtaining specimens as in a food handler survey for the carrier state, that a dry rectal swab gives us the same return or very nearly the same return as some of the techniques involving enrichment broths which use the actual stool specimen for inoculant. We get, as Mr. Davies pointed out, approximately a 3 per cent positive enteric return in carrier individuals, and our work on epidemics in Salmonellosis has demonstrated that we obtain an 80 to 90 per cent positive bacteriologic return from infected individuals. Thus, we simplify the technique tremendously, and we can plate with the swab directly on the SS Agar plate directly at the point of obtaining the specimen.

The laboratory procedure follows. This plate is incubated for 18 hours. We pick suspect colonies the following morning to a booster broth, which was described earlier. This gives us a reaction to dextrose, lactose, and indol production. We incubate this booster broth in the water bath for 4 hours and at the end of this time, those which are still negative for the two sugars are further transferred to Kligler's Iron Agar, semi-solid mannitol medium, and the Simmons Citrate Slants. These are incubated overnight with the booster broth. The booster the following morning is tested with Kovac's Reagent for the production of indol. We then select our suspect cultures by reading this series of media. We then screen the suspects serologically with the screening sera, hitting on the major groups of Salmonella and Shigella. Thus, in 48 hours, we have a biochemically and serologically confirmed answer on a Salmonella or Shigella organism. We feel that the method is quite adequate, and we have only been wrong in one instance thus far. We had one Salmonella which appeared to be Salmonella group E which we sent to Bethesda for confirmation. This turned out to be an odd strain of Paracolobactrum. It is interesting to note that at about the same time, the Preventive Medicine Unit on the West Coast sent a similar culture taken from a food handler to Bethesda, claiming it was a Salmonella group E. Theirs, too, turned out to be the same—Paracolobactrum.

I will move over to Staphylococcus bacteriology for just a moment. There are some interesting developments concerning techniques in this field as well. They certainly are not of as much interest to the physician in diagnosis as enterics, since this would be a food intoxication rather than an infection. Once a person has eaten the food, the clinical course will follow in spite of most types of treatment. However, the laboratory procedures are certainly valuable in the epidemiological studies of this disease. Selective media is used here as well as in the enterics. The selection here revolves around the salt content of the medium. The procedure usually used, the most rapid to date, requires approximately 43 to 48 hours for identification. Food, feces, and vomitus are the most common items used for the sources of inoculant. Recently, the Robert A. Taft Sanitary Engineering Center, Cincinnati,

Ohio, has developed a rapid technique for organism isolation from the suspected food. This rapid method involves a shake broth culture and takes 7 hours to positively identify the toxin producing strains of Staphylococcus.

Concerning water bacteriology, there is a great deal of work being done, and it is of great significance to the Navy. For many years now, the five tube MPN method has been utilized to determine coliform content of water. This is a method which gives us a statistical answer as to the number of coliform bacteria in water, coliform bacteria, of course, being an index of contamination. This method requires four days for a confirmation and requires up to a week and a half for a complete test, which absolutely proves the presence of coliform organisms. This method takes time in preparation, test, and reading, but it can be used in a small laboratory. It is used extensively throughout the Navy today. It can be modified for shipboard use as well. Currently, we recommend to shipboard laboratories the use of this technique when they take on water overseas.

There is a new technique which has been developed recently which evolves around an entirely new concept in bacteriology. This is the membrane filter technique. The membrane filter is basically a bacteriological filter through which you send the sample. The bacteria are thus held in place on the surface of the filter. Then by use of a saturated absorbent pad, the growth medium may be sent through the filter from below by capillary action. Selective media may be used for different organisms. Endo type broth is usually used for coliform determination in water. Thus we pick and count colonies with certain characteristics directly on the surface of the filter. These colonies rise from the bacteria left by the filtration.

There are several advantages of the MF technique over the MPN tube technique in water testing. The first of course is that one gets a direct count of the bacteria in a given volume of water. This is in contrast to a statistical estimate as obtained in the MPN tube technique. The standard is per 100 ml. of water, so we may filter 100 ml. of water and count the colonies.

Another advantage is the contrast of 16 hours for MF confirmation to the 4 days for a confirmed test with the 5 tube method. The advantages of this fast answer are tremendous in the control of water, and laboratories all over the country, particularly public health laboratories, are switching to this new method.

There are field kits available, and currently Preventive Medicine Unit No. 2 is doing quite a bit of work in the evaluation of certain field kits for use by the Navy aboard ships and by the Marine Corps in the field. The field kits may be incubated by use of an incubation vest carried by personnel under their clothing or by field incubators. One can actually directly read the bacteria in water sample being tested while working in the field. The equipment is relatively compact, and most of the kits which are being evaluated have built in incubators and entirely built in equipment for running the test.

The Sub-Standard Mentally and Abnormal Behavior Pattern Service Man*

By

CAPTAIN JAMES N. WILLIAMS, *Medical Corps, U. S. Navy*

THE subject of this paper includes many facets of the emotional disorders and each one has to be considered separately in order to gain an adequate concept of the sub-standard mentally and the abnormal behavior pattern service man. The variation in personality structure of each individual makes it difficult to find one individual that would have all the personality defects. If such were possible in any individual the problem would be a very simple one of recognition.

In order that we have a clear understanding of the problem, it would be better to define the sub-standard mentally service man as being that individual showing inadaptability, poor judgment and social incompatibility. This individual is not grossly deficient mentally or physically but has followed a lifelong pattern of inadequate adjustment to his environment.

As a rule the individual did poorly in school and often was able to complete only the grammar grades. Generally he was a problem in school because of inability to intellectually compete with others and his attempts to gain attention by unusual or mischievous acts gained him an unpleasant reputation. Most often he was allowed to drop out of school at the age of 14 or 16 because he was troublesome there; he was then able to obtain some menial type of work. At home he was recognized as a problem, needing more help to accomplish simple tasks than others. He needed additional protection to avoid being influenced by the wrong group of boys in his town.

Frequently jobs were changed as he was never satisfied with any of them and had difficulty in the community. He liked to wander and resented any authority at home. Usually he is advised to enlist in the Service to avoid further difficulty or with the hope that he may learn a trade and thus eventually become self-supporting, the idea being that he could not be controlled at home but the discipline of the Service would correct all his defects.

The abnormal behavior pattern service man is an individual who has a lifelong pattern of action or behavior characterized by the acting out of emotional feelings and emotional instability under minor or moderate stress. This individual cannot tolerate stress and shows poor emotional control so that he has to act out his tension in some manner. A difficult situation results as his behavior is not tolerated well by others and his tension increases. The pattern of reaction is not new but one that has been followed from early childhood, and whereas it probably obtained for the individual his desires when he was a child, it now becomes a very inadequate method of obtaining his wishes. However, due to the individual's immaturity of thinking and judgment, he is unable to modify this pattern of reaction and it continues on to his own detriment. The same situation occurs as with the sub-standard mentally service man—this individual is urged to enlist in the Service in order that he might become a man and that he might learn to modify his behavior pattern. In some instances it is the impulsive reaction of the individual to enlist in the Service after a quarrel or argument at home to show others what he can do in an effort to enlist their sympathy.

A definite course is followed in Boot

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* The opinions or assertions contained herein are the private ones of the author and are not to be construed as reflecting the views of the Navy Department or the naval service at large.

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Camp by both types of individuals and through immature and "impulsive" reactions they are recognized by others. Those men having more severe personality defects are unable to keep up with the routine duties required at Boot Camp, and they decompensate in some manner because their usual pattern of reaction fails them. It is necessary to eliminate them from the Service before completion of Boot Training. Many individuals with less severe manifestations are passed on because of their strong motivation for duty. The service is something new for them and as long as they are constantly distracted, they are able to keep pace to some degree with the others in the group and not become conspicuous. They have very fanciful ideas of the Service while in Boot Camp and are constantly hoping that they will have duty where there will be plenty of liberty and pay with little work. However, at the first duty assignment there is a decrease in motivation and the realities of Service life become discouraging to them. There is a lessening of emotional control and the display of impulsive behavior is inadequate to the situation and immature in character. In a duty situation the sub-standard mentally service man has difficulty competing with others, of understanding situations that confront him. He soon becomes the butt of the jokes and ridicule of others in the group and is often taken advantage of by them. He soon becomes rather resentful, frequently he is transferred from one division to another. Each time it is more difficult for him to do the assigned jobs satisfactorily because of his emotional tension, resentment and continual criticism by others. It is difficult for him to continue in this manner because he feels others are receiving credit for doing a good job and he only receives criticisms. He then becomes more withdrawn and passive in his reaction, having less motivation for Service and only desires to escape by some means. It is about this time that the individual is sent to the psychiatrist for consultation or else transferred to the hospital for study because of his inability to perform his duties.

The Abnormal Behavior Pattern Service Man follows a very characteristic course from the time he reports to Boot Camp until he is released from active duty. Usually he has fairly good motivation at Boot Camp because the others are having difficulty too and because he is confronted with the same problems as the others in Boot Camp he is not noticed. Often he has very strong motivation to change his pattern of behavior and to show his family that he can conform and be one of the group. This may carry over to the Boot leave at which time he is highly motivated and rather proud of himself because he has identified with the group—that is the Service—and he is anxious to surprise his friends because they did not expect him to remain in the Service this long. It is not until some time after his assignment to a ship that he begins to revert to his old behavior pattern and his motivation sinks to a low level. He shows poor emotional control, is unable to take orders and has a low threshold of frustration. He acts out his resentments and feelings of hostility in an immature and childish manner. He is the individual who builds up, as a rule, feelings of resentment and hostility and suddenly unleashes them in a destructive manner—breaking objects, accusing others but very rarely actually fighting with others. He often makes many threats to conceal his feelings of insecurity but seldom carries them out. There are several types of individuals in this group that act out their feelings in different ways. One type may act out his feelings in a hostile, agressive manner, such as making threats, destructiveness and projecting the blame for failure on to others. Another type of individual reacts by withdrawal from the offending or frustrating situation. He retreats within himself and his environment. Another type of individual tends to become more dependent upon others and may complain of multiple somatic symptoms.

If these individuals are placed under more pressure or the environment is made more difficult in an effort to correct their immature reaction, they may go to even greater length to retaliate or act out the emotional

feelings. Some make suicidal threats or suicidal attempts of some kind in an effort to gain the attention they want or to relieve the intense emotions they feel.

One thing the threat of suicide or the attempt at suicide does accomplish and that is to get the individual to the hospital at once. The reaction of most people to such a threat is fear, particularly when they have tried to deal firmly with the individual and their own guilt feelings are increased. They must act to protect themselves and get rid of him by a rapid transfer to the hospital. In the hospital most of these individuals feel more protected and there is a decrease in tension. There is an escape from confinement in the brig and on a closed ward they do well. The acting out on a ward is encountered when he is told that a return to duty is necessary and often there is a panic reaction. This is characterized by temper outburst, threat of what he will do or multiple somatic symptoms that are disabling. It is a rare individual that will have the ego strength to make another try at duty.

When the individual finds the situation intolerable, he may follow yet another pattern of behavior—that of passive or active withdrawal. He retreats from the frustrating conditions by remaining to himself—daydreaming, offering passive resistance or obstructing others. There is a lack of interest in personal appearance and less attention is given to surrounding activities. The reaction varies in degree of intensity in different individuals from that of slight withdrawal from the group to panic reactions. This indicates the weakness of the ego and of the ego being completely overwhelmed by the problems the individual has to face. He finds that his usual pattern of reaction is not achieving desired results and panic ensues resulting in a more complete withdrawal from reality situations. The condition is often increased in severity by lack of understanding and the use of strict disciplinary measures. These individuals cannot be driven to mature behavior but need a more understanding attitude in order to strengthen the already weakened ego and help the individual react in a more appropriate manner.

The misleading factor in these individuals is that too often the appearance of the individual would lead one to think that he is an adult and to expect an adult reaction, whereas this is not the situation. The individual may appear to be physically mature but is emotionally immature, and as a result, is unable to maintain emotional stability and judgment when subjected to minor stresses. For example, the individual may appear quite dependent, immature, unstable and impulsive in the ward setting or in his reaction with other members of his group, yet the same individual when he appears at Mast gives the outward appearance of being a mature adult and self-reliant. For a temporary period he is able to put on a facade of stability, thus creating the appearance to others that he is capable but simply does not want to do the assigned task. This action furthers the idea that if these individuals are treated in a strict authoritarian manner that they can perform their duties as well as anyone else. This proves the point that is well recognized—that just looking at the individual or making a superficial judgment is very misleading and false. In addition, it should dispel the idea that the individual is fooling the psychiatrist or that the psychiatrist is simply being over sympathetic in trying to protect the individual; thus, allowing him to act out his emotional feelings without making any effort to correct the condition.

The questions often asked are "How do these individuals get into the Service" and "Why are they not eliminated at an early stage?" It seems that their elimination would be relatively easy in view of the intensive psychiatric methods and psychological tests that are available at this time, that it would be difficult to miss or overlook only a very small percentage of these individuals. There are several problems that have to be considered in answering these questions. The first is, in the rapid examination required of selectees, there is little time allotted to each individual and no extensive examination can be made. The other factor is vitally important at this time—in most instances the individual is strongly motivated for service. He tends

to conceal his feelings and pecularities and is able to put on a facade that gets him by most superficial examinations. In Boot Camp the individual is again scrutinized and a longer period of observation is possible. Here again the same situation is encountered, that the high level of motivation helps the individual overlook his emotional problems and difficulties during this period with the strong hope that when he finishes Boot training that duty will be entirely different. He also looks forward with great desire to Boot leave in which he can for a temporary period be in uniform, and impress others that he was accepted and that he had (regardless of their prognosis) made the grade. All of these factors tend to stimulate motivation and help the individual to conform for this period of time. Another factor that is encountered has been that, during the war, studies of individuals previously rejected for neuropsychiatric disorders and later taken into the Service revealed that (according to some reports) as many as 74% performed satisfactory service. These studies, we must remember were made during war times, when patriotism was at a high ebb and to be in the Service was considered a great honor. In peace time the situation is changed considerably. There is less feeling about being in the Service and thus patriotism is at a lower ebb than during war time conditions. This alters very much the adjustment of individuals and motivation is decreased. When there is a threat of a single enemy most individuals with emotional and behavior disorders can perform very well, but when this threat is removed they then regress to their basic emotional and behavior patterns of reaction and thus their adjustment is very poor. There is another factor—that jobs have been good in recent years and that the individuals drafted into the Service have been resentful about having to give up good jobs and undergo the rigors of military Service with a reduced income. Motivation for Service is a very vital ingredient and difficult to test because it fluctuates depending upon emotional drives and situations encountered at the time. It may be very strong if there is some external threat to the group and the individual is able to identify himself with the group. We encounter individuals without any personality disorder that vary as to motivation, such as the individual that had a difficult day, things did not go right and he threatens to get out of the Service. He is fortunate in that he has the stability to control his feelings and not act out in some impulsive way. However, the emotionally unstable personality can not reason out the cause for discouragement or change in motivation and impulsively acts out his feelings—usually by going AOL, getting intoxicated, etc.

The unstable individual's reasoning is childlike; for example, he has to blame someone for his failure or to say that bad luck just follows him and he can not escape it. What he is doing is avoiding the acceptance of any responsibility for his actions and placing the blame either on someone else or just on luck.

Abnormal suggestibility plays a role in this group of individuals—being immature and dependent they are more open to the influence of others. They hear one person complain or threaten to go AOL and they are ready to follow. They do not tolerate routine. They become restless. They need frequent changes either of environment or type of work in order to avoid thinking about themselves as they can not tolerate introspection. Thus, there are no tests at present that are infallible for measuring the motivation in individuals and as a result there is a wide variation of response to a given situation depending upon the strength of motivation of each individual.

Another factor is that of the attitude of various examiners to the personality disorders; some feel the individual should be given a chance at active duty, whereas there are other examiners that will reject the individual even on insignificant symptoms. This plays a role in the induction of individuals to active duty. At the time of examination either at the Selective Service Board or at Boot Camp, the examiner must rely largely on his impression of the individual. There is no information or social

history available at this time and much can be concealed by the individual if he desires. There are many examples of individuals failing to give helpful facts concerning past illness in such a manner that it would be difficult to make a legal case of it later. There are other incidents when individuals once surveyed for a psychiatric disorder are re-enlisted at a latter date and have the same problems again.

Many papers have been written concerning treatment and management of individuals with personality and behavior disorders. To date there has been no specific method that is applicable to a large group and which has proven successful to the degree that these individuals are made fit for full duty. The important point is that we are dealing with a variable factor called motivation which is easily influenced by various situations and attitudes of others. We have all seen situations in which individuals with personality and behavior disorders have reacted well under good leadership, whereas the same group have performed poorly when this leadership changed. There is a marked variation of reaction to the same situation. Some do well when given a certain type of work for which they have ability and often times poor placement in the job situation is an important factor in failure of the individual to complete his duty satisfactorily.

One situation that does not help this group of individuals is hospitalization. After a period of hospitalization, many of them are more difficult to get back to duty than they were before. The effort always is to prevent these individuals from being hospitalized, to treat them as outpatients, as hospitalization has a detrimental effect on their motivation.

One field of therapy that has not been used extensively with these individuals who have personality and behavior disorders is group therapy. It has been found in many places that group therapy has been extremely beneficial in making the individuals understand their particular personality problem. Group therapy is less time consuming than individual therapy and can be arranged on an outpatient basis. Such a plan might be tried aboard ship as it does give these individuals a period of ventilation of feeling; and at the same time that of understanding the inappropriateness of their particular emotional reaction.

The basic problem is that of helping these individuals mature and gain emotional stability. They have been unable to gain this from early childhood due to various unfortunate situations that they could not control. The optimistic outlook is that these individuals will eventually mature and gain stability of emotional reaction but some are so severe that the Service can not wait for this maturing process to take place.

When released from the Service the majority of these individuals return to a home environment that offers more security than the Service and having gained some idea of their personality defects while in the hospital they make an effort to adjust. Follow-up reports indicate that after a period of time they find their "niche" and do well. There are some that follow the advice of receiving help from the local psychiatric clinic. This aids in their adjustment to civilian life.

There is a small minority that do not improve and continue to be a problem to the community; they spend time in jails or mental hospitals.

The Army Reserve—Nurse and Medical Specialist*

By

COLONEL INEZ HAYNES, *Army Nurse Corps*†

OUR first Commander-in-Chief, General George Washington, advised, "In time of peace, prepare for war." This bit of advice has been well taken for it has become the keystone of our present day Reserve program. It is expressed in the stated mission of the Reserves, which is "to be capable of furnishing in the event of war or national emergency and at such other times as national security may require (a) units effectively organized, trained and equipped in time of peace for rapid mobilization expansion, and deployment and (b) additional qualified personnel for necessary replacement and expansion of the Army."

This mission, although it sounds formidable, must, nonetheless, be accomplished at the earliest possible moment, if we are to have a truly Ready Reserve, capable of taking its place beside the active services to defend our country in time of need. In the past, at the outbreak of hostilities, we have had time to organize, train and equip the men and women needed for the expansion of our active service. In the future war, we have been told, we will not have this time element, therefore, it becomes more and more urgent that we utilize, most effectively, the time we have now to our best advantage.

In order to "organize, train and equip" we need people and this brings us to a major problem facing the reserves, i.e., the procurement of nurse and medical specialist personnel. In the Army's Ready Reserve Medical Units, the ANC and AMSC spaces are only ten percent filled. This poses a very pressing situation, if our units are going to be able to function when ordered. I would like to explain briefly two procurement programs that the Army is currently offering. It is true, as some of you will say, that this is active Army procurement, but in the long range approach, if we can get an individual interested in the military, I believe, following a period of active duty, he or she will be interested in keeping affiliated with a Reserve group.

1. THE ARMY STUDENT NURSE PROGRAM

In this program, a young woman who is currently matriculated in an approved school of nursing at the end of her second year may volunteer for the Women's Army Corps with concurrent call to active duty for the purpose of entering in the program. The individual will be enlisted as a private, and will receive the pay and allowances of this group for either one or two years, depending upon the length of her basic nursing program. She will attend her own school of nursing and will not wear a uniform and the Army in no way dictates to the school of nursing insofar as curriculum, policy, etc. Upon graduation and passing of the State Board of Nurse Examiners Examination, the young woman is given a Reserve commission in the Army Nurse Corps and agrees to serve on active duty either two or three years, depending upon the period she was in this program.

The first group of "graduates" from the program has entered the active service. They are an alert, interested group, and we are following their progress with a great deal of interest.

2. THE ARMY REGISTERED NURSE STUDENT PROGRAM

Many of our young nurses who have completed their "RN," are interested in furthering their education. The importance of obtaining an academic degree, with its accompanying preparation in the fields of teaching and supervision, has been greatly stressed

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† Chief, Nursing Division. Office of the Surgeon General of the Army, Washington, D. C.

in the last several years. The Army is offering a program to qualified young women who can complete the requirements for either a baccalaureate or a master's degree within one calendar year. The individual is given either a first or second lieutenant commission in the ANC-Reserve with concurrent call to active duty for the purpose of participating in this program. She matriculates in the college or university of her choice and after receiving her degree serves in the active Army for the remainder of a three year period.

Through this program, the Army is not only helping itself, by obtaining well prepared officers, but is providing a unique opportunity for young women who could not complete a college education without added financial assistance. With the crying need for teachers, administrators and supervisors in the nursing profession, the program has been the answer to many deserving young women.

While there is a definite need for increasing the number of persons in our Reserve program, there is also a need to keep what we have. There is nothing as deadly as going to a meeting, doing nothing, and not having any interest in what the speaker is saying; yet this is what is happening in some of our Reserve units insofar as Army Nurse Corps and Army Medical Specialist Corps officers are concerned. As a result they lose interest and drop out of the Reserves. How can we overcome this apathetic attitude? As nurse-officers there is much that we can contribute to our Reserve units. We can volunteer to teach either at the total unit meeting, or with a smaller group of Army Nurse Corps officers or enlisted personnel. We can volunteer to help in the planning of the training program. In other words, we can get on our feet and prove, as our Commanding Officer put it, "I just can't get along without our nurse officers. They are really worth their weight in gold!" Naturally it takes courage to get up on one's feet and talk, but what better place can we find, if one does not do too well, than among one's friends? Nurse officers, in time of a national disaster, are going to be called upon to provide the necessary leadership, which means a thorough knowledge of teaching, administrative and supervisory skills. So, volunteering to teach is actually training for the nurse officer—in addition to providing training, getting involved, has in my experience, proved to be a morale lifter and an interst stimulator.

What I have mentioned above leads into the next topic for discussion, that of *Training.* Nurse officers should and can carry a large portion of the responsibility for the training of the enlisted personnel, particularly those assigned to the Nursing Service. There have been two major problems that have troubled nurse officers who are trying to start a training program—one is lack of space and, secondly, lack of equipment. These two areas go hand in hand, for although equipment is available, storage space in most of our armories is at a minimum; therefore, commanders are reluctant to requisition training equipment. Have you ever tried to teach basic nursing without some kind of equipment, no matter how improvised? It is nigh impossible. Many of our units found this problem and solved it!—Since the reservist is a citizen-soldier, many of the officers of the units are on the staffs of hospitals, schools of medicine and schools of nursing in their local communities. Through the efforts of these individuals, the use of nursing arts laboratories were arranged. This not only helped the training of the unit but was an excellent public relations tool!

Recently, Army Medical Reserve units have been given the authority to start negotiations with the State and local Civil Defense Agencies for use of the 200-bed Federal Civil Defense Agency Hospital Assembly. The use of this equipment will provide opportunity for the Reserve units to familiarize themselves with the equipment of small hospitals, which, while not identical with the equipment they might eventually employ, is in many cases quite similar and actually a valuable temporary "replacement" for the TOE medical unit assembly.

Again, in the field of training, I would like to point out that many of the profes-

sional postgraduate short courses are open to *Reserve officers.* Such courses as, "Nursing in the Medical Management of Mass Casualties," "In-service Education," and "Nursing Administration" are among the nine courses specifically designed for the Army Nurse Corps officer. Reserve officers, who have attended these courses, have found them very worthwhile and have taken a wealth of knowledge back to the Reserve unit.

I started the discussion with a quotation from our first Commander-in-Chief; I would like to close with a quotation from our present Commander-in-Chief, President Eisenhower. "We must remember that the active military forces are only the cutting edge of our nation's full strength. A vigorous economy, a strong mobilization base, and trained citizens are the invincible elements in our military striking power. In case of global war, the nation could not count on having time to marshal its strength while the enemy was engaged elsewhere. Unquestionably, the United States would be involved from the outset of such a conflict. We must be prepared."

Those of us in the active military service are prepared to assist the Reservist in all ways possible; however, in the final analysis, it is up to the individual Reservist to assume his full responsibility to train and *be prepared.*

NEW MILITARY PAY SCHEDULE

Rank	Years of Service	Basic Pay	Hazard Duty	Quarters allowance	Subsistence	Personal money	Total with hazard pay		Total without hazard pay	
							Monthly	Annual	Monthly	Annual
JCS	30	$1,875	$165	$171	$48	$333	$2,592	$31,104	$2,427	$29,124
0–10	30	1,700	165	171	48	183	2,267	27,204	2,102	25,224
0–9	30	1,500	165	171	48	42	1,926	23,112	1,761	21,132
0–8	30	1,350	165	171	48		1,734	20,808	1,569	18,828
0–7	26	1,175	160	171	48		1,554	18,648	1,394	16,728
0–6	22 *(5)	910	245	137	48		1,340	16,080	1,095	13,140
0–5	18 *(4)	720	245	137	48		1,150	13,800	905	10,860
0–4	16 *(4)	610	230	120	48		1,008	12,096	778	9,336
0–3	12 *(3)	510	200	103	48		861	10,332	661	7,932
0–2	5 *(1)	370	150	94	48		662	7,944	512	6,144
0–1	2 *(1)	251	105	86	48		490	5,880	385	4,620
W-4	24 *(2)	543	165	120	48		876	10,512	711	8,532
W-3	21 *(3)	470	140	103	48		761	9,132	621	7,452
W-2	16 *(2)	393	135	94	48		670	8,040	535	6,420
W-1	13 *(1)	345	130	86	48		609	7,308	479	5,748

* Years in Grade 1 for pay purposes. This may be more than the number of years of service as an officer.

Future Plans for Reserve Medical Officers*

By

CAPTAIN D. J. O'BRIEN, *Medical Corps, U. S. Navy*†

I WANT to talk to you in general about the reserve program and about the degree of obligation that I feel certainly all of us should have. The Reserve is a vital adjunct of our security team.

All of you are well aware of the emphasis presently being placed on the various Reserve Programs. Can you honestly plead that you cannot participate in the Reserve Program because you are too busy elsewhere? Granted that the medical men of this nation are extremely busy, are they too busy to recognize the fact that their very nation is constantly being threatened by an opposing ideological force?

Military Service is not popular nor has it ever been so, and today with the democracies' steadily rising tide of material prosperity, there is very little sympathy with anything incapable of yielding a profit. Patriotism often takes a back seat in a life that is dominated by the personal ideal that embraces success by being ruthlessly competitive in the race for riches.

The man who makes a success in his endeavors does not always make a success of life. Too often does the "winner" ignore the impersonal ideal of service to his country and fails to realize that prosperity is based on social security and that there can be no such thing as social security until you have first made sure of national security.

The Department of Defense is in the process of building the Ready Reserve to a 1960 strength of 2,900,000 men. That force is the insurance policy that will help keep this nation free. With the world full of trouble spots—Korea, Indo-China, Suez and the Middle East, the need for insurance is only too evident. Let me remind you that no longer do we have the advantage of a six-month preparation when war comes. It is necessary for us to prepare now for when it comes, it will be here with us in our own backyards from the first moment on. Those of you who are now in the Reserve Force should pass the word to your colleagues to affiliate now so they will be ready if and when war comes. There is little likelihood that there will be time then.

President Eisenhower, on speaking at the end of Operation Alert last year, stressed this urgency when he said: "We must remember that in the kind of disaster of which I am speaking one trained Reserve Battalion in the proper place would be worth five divisions located a thousand miles away. Trained men will be needed on the spot at the time the disaster occurs to respond to the calls of the mayors, governors and the federal government."

Because the maintenance of a large standing regular military force would cause a prohibitive tax burden, present planning indicates a regular force adequate for "Brush Fire" wars backed and supported by a strong and effective Ready Reserve. This system gives our country the optimum security for the best spent defense dollar.

This Ready Reserve must be prepared to take instant action should an atomic war or even a conventional war engulf us. The recent flight of three Strategic Air Command B-52 bombers around the world in 45 hours indicates the closeness of our association with our potential enemies. We need not think with ostrich-like security, that other countries would not be able to accomplish the same mission and make it more than a drill.

Too, our national policy has continually reiterated that the United States will not

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* Presented at the First Annual Medical Department Symposium, U. S. Navy Hospital, Portsmouth, Virginia, October 17, 1957.

† Director, Reserve Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

strike the first blow. This truly means that our chin is out and without a Reserve Force, maintained in an advanced state of training, it would further leave us open to a knockout blow.

There are those who would say that the advent of new super-weapons, the guided missile, nuclear reactor, the hydrogen bomb and the tactical atomic weapon, reduce the necessity for a vast aggregation of men or at least an aggregation that by force of numbers alone would turn the tide of battle. In spite of automation and rumblings of push-button war, the vital necessity for men continues to exist. As weapons become more automatic, maintenance becomes more complex and calls for the services of many skilled men. One Army Corporal Rocket requires 250 men for servicing alone. The Reserves are not attempting to build a vast force of untrained men, but rather a force of men that understand and competently operate the complex array of new weapons used by all services. This admittedly cannot be done in one short six-month active duty training period. This period must be amplified by reserve training one night each week and a subsequent active duty training period for a fortnight each year.

The lack of volunteers among the young men of this nation for such a program does not necessarily indicate the failure of the program or dictate its abolishment. Perhaps the fault lies with the youth who would rather sit back and wait for the draft—those who have the attitude that they "never volunteer for anything—that's for the squares." Perhaps, after a little quiet soul-searching parents could well shoulder some of the fault.

True, the world today is extremely complex; each boy is called upon to master many things that will lead to his ultimate success in business, the professions or industry. Too, there are only a limited number of adolescent years that may be apportioned for these tasks. Small wonder, then, that many of us, and I am speaking of adults as well as youths, consider the time spent in military obligations as a chore to be done but resented. This gives rise to a new group of adults who have a sour taste in their mouths about military service and this taste is most easily passed on to their children.

We need today a return to the concepts of our forebears—a realization of a sense of duty to our country, a realization that service to country is an honor and an opportunity for all to reaffirm faith in our democratic way of life. We must get away from the old concept once echoed by Disraeli that "the services in wartime are fit only for desperadoes; in peacetime fit only for fools."

We must encourage and incubate the idea that any military service, be it Reserve or Career, can offer none of the personal material rewards of civilian economy but must be founded upon an impersonal ideal of service to the community; service in the peaceful preservation, through armed strength, of a particular way of life. For it should never be forgotten that the fighting man is not the enemy of peace but its watchful, constant guardian.

The civilian support of the Reserve should not be a mere toe-testing of the water, but a complete plunge into it. The support and the participation must be wholly active, not passive. Might I add that those who put the most into their military training and duty are those who will in the long run get the most out of it.

When our people learn that our men and women must be reserve warriors as well as citizens, people who make some conscience of what they do, who know what they fight for and love what they know, then fear of aggression from without and decay from within will vanish.

The improved Reserve Program will place organized Reserve Units dispersed throughout the United States with at least one and in most instances many units in every potential target area.

Ready and trained reservists will not only add greatly to the deterrent strength of our armed forces but also provide, in case of a major emergency of disaster, additional support to civil defense.

The route America has chosen to follow

in meeting communism's threat is the route of sustained strength. We are geared for the long haul—in our active forces, our Reserves and in our concern for the health of our vital economy.

To help maintain this program and to build it to even greater strength America's people need to come forward in its support. Communism's sensitive geiger would suffer a great shock tomorrow if it were to feel the tremor of an America that had all of the total spirit and action of our young men.

Knowing the realities of modern war our only choice is to build great strength to deter attack and keep it ready. And knowing that, we must also be prepared to defend ourselves, if ever such deterrent power failed to prevent a conflict.

As to the medical men and the Reserve program, there is little need for me to define the role of medicine in this vast and complex reserve organization. Rather I would like to sum up the responsibilities of the medical man in the short phrase, "A healthy soldier or sailor is an asset to the fighting team; the sickly one only a deficit to himself and to his companions."

The newly licensed doctor, the pre-medical student, the medical student and the practicing physician should all be brought to realize that the military machine, Reserve and Regular, cannot function without their services. You who already understand this must bring this understanding to all others so we will not find ourselves in the midst of a disaster without the help we need.

Decedent Affairs*

By
LIEUTENANT H. P. MILLER, *Medical Service Corps, U. S. Navy*†

THE thirty minutes which have been allotted to me this afternoon to discuss decedent affairs are inadequate for a subject of such magnitude and which encompasses and extends into so many fields of administrative endeavor. While the decedent affairs program itself is concerned primarily with the recovery, identification, care and disposition of remains of deceased persons for whom the Department of the Navy is responsible, it overlaps and enters into the fields of finance, disbursing, personnel administration and is strongly tied in with the Casualty Assistance Calls Program which is currently in effect throughout the Naval establishment.

Decedent affairs, too, are of vital importance to the service, insofar as public relations are concerned, for even the slightest error, oversight or erroneous commitment to a grieving survivor may create a life-long resentment against the Navy Department, if not the entire military establishment; may cause grave embarrassment and loss of prestige to the service and may well result in the ruination of the career of the person who may have been so unfortunate as to have, and perhaps innocently so, made the error.

The decedent affairs program as established by the Secretary of the Navy is divided into two distinct programs—the current dead program and graves registration. The latter program is the decedent affairs program in support of a major military operation and the current dead program is that which is in effect when the Graves Registration Program is not in effect. It is, therefore, the current dead aspect of the decedent affairs program which is of primary concern to us here today.

The question of moment now is: What does the current dead aspect of the decedent affairs program encompass? Briefly, and rather broadly, it encompasses the search for, recovery and identification of remains, notification to the Secretary of the Navy and to the next of kin of the deaths of members of the Naval service; collection, temporary retention for purposes of identification and disposition of decedent's personal effects; preparation; clothing; encasement and shipping of remains; making arrangements for and instructing corpse escorts in the performance of their duties; provision of an American flag and lastly, cremation or burial of remains.

It is the stated policy of the Department of the Navy that remains for which the Department is responsible shall be cared for in keeping with the highest traditions of the Naval service and surviving relatives accorded the consideration and sympathy which is their due.

It would appear, then, that the objectives of the current dead program are the immediate recovery and identification of deceased personnel, attainment and maintenance of high standards of and uniformity in services provided, minimum of elapsed time between death and delivery of remains to the next of kin and prompt notification to next of kin of matters pertaining to the decedent affairs program.

Over-all responsibility for the formulation and promulgation of policies, standards and procedures pertinent to the decedent affairs program has been delegated to the Bureau of Medicine and Surgery in cooperation with the Commandant of the Marine Corps.

Within the continental limits of the United States, each district commandant is respon-

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† USS *Franklin D. Roosevelt* CVA-42.

sible for the administration and coordination of the decedent affairs program within his respective district; with the exception of Marine Corps activities normally commanded by a General Officer where an annual care of the dead contract is not in effect, the U. S. Naval Hospitals and the U. S. Naval Dispensary, San Francisco, California. Here the responsibility of the Commandant is limited to co-ordination.

On the command level, this responsibility devolves upon the Commanding Officer, but the actual functions are ordinarily executed under the supervision of an officer of the Medical Department.

Without the continental United States, the commander of each unified command is, through his subordinate commands, responsible for the proper functioning of the Decedent Affairs Program within the geographical limitations of his command. In addition, each commanding officer bears the responsibility for administration and operation of the program's function, although, here again, the actual operation of the program's mechanics ordinarily devolves upon an officer of the Medical Department.

While the Secretary of the Navy has established the decedent affairs program in the Naval Establishment, the Bureau of Medicine and Surgery has implemented the program, has delineated responsibility at the various levels of command and has, in Chapter 17 of the *Manual of the Medical Department*, outlined the various procedures which are to be followed in executing the details of the Decedent Affairs Program.

Since the ordinary contact most of us present have with the decedent affairs program is limited to our experience at Naval Hospitals, I feel that this aspect of the program is of primary importance and will, therefore, devote the remainder of this discussion to decedent affairs at a naval hospital.

Before progressing further, it would be well to consider for a few minutes the basic benefits to which active duty members of the Naval service are entitled insofar as the program is concerned. Basically, and rather broadly, they are removal of the remains, preparation, clothing, encasement, and shipment to point of interment designated by the next of kin. In addition, the next of kin is entitled to reimbursement for secondary services in an amount not to exceed $125.00 if burial is in a private cemetery, or $75.00 for services not duplicated by the Government if burial is in a national cemetery. In the event the next of kin elects not to use the facilities of the contract undertaker, reimbursement in an amount not to exceed the contract price may be made.

Generally, there are others, aside from active duty members who are entitled to either all or part of these burial benefits, but as the circumstances vary in each particular instance, each case should be considered on its own merits and I hesitate to make a flat statement concerning this matter. I feel that the *Manual of the Medical Department* and effective current directives should be consulted for guidance in each and every instance where there is cause for doubt and when the doubt cannot be resolved locally, then recourse must be made to the Bureau of Medicine and Surgery.

What happens when death occurs to set the mechanics of the program in motion? While each Naval Hospital has its individual administrative procedure, the over-all pattern is basically the same. The medical officer who has pronounced the patient dead prepares a locally designed form on which is indicated the decedent's identification data, cause and time of death, religion and other pertinent matters which may be of importance in the case. This form is routed to the Officer of the Day under whose cognizance the proper chaplain is notified, an entry made in the hospital journal and the form then routed to the decedent affairs office where measures are instituted to effect notification to the Secretary of the Navy and the next of kin. The decedent affairs office generally obtains fingerprints from the remains on the ward prior to delivery of the body to the morgue (for the purpose of awaiting disposition).

The context of the message to the next

of kin will, of course, depend on the status of the decedent at the time of death. As a general rule, in the case of dependents and other supernumeraries who are other than active duty members of the armed forces, the notification to the next of kin will furnish information as to the time and cause of death, a request for telegraphic disposition instructions and a statement advising as to the Navy's inability to defray any of the expenses incident to removal, preparation, clothing, encasement, or transportation of remains, together with an expression of sympathy. Most frequently the next of kin in these cases will be present and instructions for disposition of the remains received prior to their departure from the hospital. When such is the case, all matters with which the hospital is concerned may be cleared up within a relatively short period of time. These matters usually include, but are by no means limited to, disposition of the remains, disposition of valuables and personal effects, preparation and submission of both Naval and civil death certificates and termination of the decedent's chart.

In the case of active Naval personnel, matters are not so easily handled. Ordinarily the next of kin is not present, necessitating a delay in awaiting disposition instructions; a delay which has been slightly prolonged by a change in notification procedure to the next of kin recently promulgated by both the Chief of Naval Personnel and the Commandant of the Marine Corps. Heretofore, casualty messages were limited to one message which included information as to time and cause of death, information as to burial benefits to which the decedent was entitled, a request for disposition instructions from the next of kin, their desires with respect to the furnishing of a corpse escort and an expression of sympathy. Perhaps this was a great deal to digest following a notification of death. The new procedures, however, call for two telegraphic messages to the next of kin—one which indicates the time and cause of death, contains an expression of sympathy and advises that a second message is forthcoming. A notification of delivery must always be requested from the telegraph company when this type of message is released. The second message, which is released following receipt of a notification of delivery, advises the burial benefits to which the decedent is entitled, requests disposition instructions and the next of kin's desire with respect to the furnishing of an escort.

When the next of kin is not present, the remains may be released to the contract undertaker for preparation, clothing, and encasement because the casualty message in this circumstance indicates that this will be accomplished. When the next of kin is in the immediate vicinity, however, the remains should be held pending disposition instructions inasmuch as the next of kin may not desire to avail himself of the services of the contractor.

The contract undertaker, upon notification, will effect removal of the remains to his establishment where he will effect cleansing and embalming of the remains. The undertaker should be advised as to any unusual circumstances concerning the case and, if known, the destination to which the remains will be consigned. The contract allows the undertaker a period of thirty-six hours from the time he effects removal of the remains until the time of the first inspection. It is only in very unusual circumstances that it is necessary for him to utilize the entire period. On occasions when extensive derma-surgery is required in order to render the remains viewable or when the remains are in an advanced state of decomposition, he may require the entire period allotted him under the provisions of the contract.

The first inspection of the embalmed and unclothed remains is for the purpose of ascertaining that the body has been thoroughly embalmed, cleansed, cosmetized, all wounds and autopsy opening properly sealed so as to prevent leakage, that the remains are odor and vermin free and in such state that arrival at the point of consignment in good condition may reasonably be anticipated. It is at this point, too, that a determination as to

the viewability of the remains must be made and a decision be made as to the type of casket required. The determination as to viewability or non-viewability of remains, incidentally, is no easy matter and I dare say that there is no rule of thumb which may be used as a guide in questionable, borderline cases. Each case must be considered individually and he who makes the ultimate decision must be prepared to later justify his stand, for it has been my experience that regardless of which course of action you may follow, someone along the line will consider you to have been in error.

Insofar as the quality of the embalming process is concerned, most frequently we must depend upon the honesty and integrity of the embalmer. There are certain signs to look for, such as firmness of the tissues, but there are, in this, as in other professions, many tricks to the trade. I am not an embalmer and must, therefore, rely on the external appearance of the remains and the word of the embalmer in arriving at a decision as to whether or not the embalming will prove to be efficacious.

With respect to a determination as to the type of casket which must be used, this depends upon the cause of death and condition of the remains. When death has occurred as the result of a communicable disease, the use of a type I casket which is equipped with an airtight inner seal is indicated. This type casket is also indicated when remains are not viewable due to mutilation or decomposition, but here again, there is no rule of thumb in questionable cases. The price differential between type I and type II is certainly not enough to offset the difficulty which might result were a type II casket used in a doubtful case where a type I casket should have been used.

The contract allows the undertaker an additional twenty-four hours between the first and second inspections. This period may be used to correct discrepancies noted on the first inspection, but most often, the second inspection is held immediately following the first. It is an excellent idea to examine the casket between inspections to make certain that it conforms to specifications and that it is in suitable condition for use. In my opinion, the slightest flaw in the casket is cause for rejection. The second inspection is held after the remains have been clothed in a dress blue uniform and encased in the casket. The purpose of this inspection is to ascertain the appearance of the remains, the completeness and fit of the uniform, the position of the remains in the casket and to make certain that any discrepancies which may have been noted during the first inspection have been corrected. It is also at this time that the shipping case is inspected and the casket tagged with a NOT TO BE VIEWED tag in non-viewable cases.

It is desirable that deceased persons be buried in their own uniforms, if they are in suitable condition for burial. Here again, however, whenever a serious doubt exists as to the uniform's fitness, the procurement of a new uniform is the best course of action. It is advisable to clothe all remains, viewable and non-viewable cases alike, except, of course, in the latter case when decomposition or deterioration has occurred to such an extent that clothing is neither practicable nor feasible, in which event the uniform should be laid out atop the innerseal and the lid of the casket closed.

The corpse escort, if desired by the next of kin, may be military or civilian. If military the escort should be of equivalent or higher grade than the deceased and if feasible, it is preferable that he be either a friend or associate of the decedent. The corpse escort should be thoroughly indoctrinated in his duties prior to departure of the remains and should be furnished with a mourning band, orders and railway tickets. Travel of escorts are authorized from place of death or port of entry to place of burial and return; or from place of burial to place of death or port of entry and return. In addition the travel of civilian escorts may be from the point of shipment or port of entry to place of burial, thence to a destination selected by the escort; or from any point to point of shipment or

port of entry, thence to place of burial, thence to any point selected by the escort. In any event, the cost of such travel should not be in excess of the round trip from the point of shipment in the continental United States to the place of burial.

Time does not permit a detailed discussion of transportation of remains authorized. Suffice to say, though, unescorted remains are shipped by express on a government bill of lading and when escorted, are shipped on a one way first class adult ticket. Shipment may also be effected by commercial air freight, if available, on government bill of lading in which event an escort may not be furnished. Government air transportation will normally not be requested or furnished within the continental United States; however, if final destination is outside the continental United States, authority for the use of Government air transportation may be requested from the Bureau of Medicine and Surgery from the shipping point in the United States to the air terminal in the area in which interment is to be made.

When a shipping schedule has been firmed up in any case, it is wise to telegraphically advise the next of kin, the receiving undertaker, the commandants of the Naval districts concerned and the Bureau of Medicine and Surgery. A second telegraphic message is normally dispatched to the same addressees when shipment has been effected and the consignee requested to meet the train.

To return to the subject of notification to the next of kin, this is the responsibility of the command to which the decedent is attached, that is, of course, within the continental limits of the United States. When death occurs outside the United States, notification is made by the Chief of Naval Personnel. There seems to be a general belief, however, to the effect that this responsibility devolves upon the naval hospital holding the remains of deceased members whose deaths occurred while away from their parent commands on leave, liberty, or other status. For example, remains of an individual who was killed in an automobile accident are delivered to a naval hospital. The hospital has no information other than the identity of the deceased and usually the name and location of the command to which he was attached. It is, therefore, impossible for the hospital to take any action other than to advise the command concerned of the circumstances. The command must then take measures to notify the Secretary of the Navy and the next of kin; must convene a board of investigation and take measures to terminate and dispose of the member's records and accounts and effect disposition of his personal effects. The hospital, of course, will take care of procuring a civil death certificate from the medical examiner and will hold the remains until authorization for their release is received from either the decedent's command or the investigating body. Upon receipt of this authority, the remains may be released to the contract undertaker pending disposition instructions from the next of kin who should have been advised to communicate his wishes to the hospital holding the remains.

An interesting point for consideration is this—who is the next of kin? The next of kin is always the current spouse of the member, or, in the case of single persons, the one who has been designated such on the Report of Emergency Data filed in the member's current service record. In cases of doubt, of course, recourse should be had to the Bureau of Naval Personnel. One thing we should strive to avoid is embroilment in family misunderstandings wherein, for example, each of the divorced parents of a decedent claims the right to disposition of remains whereas the member has designated a brother or sister as his next of kin. The decedent's wishes in such a matter would, of course, be the deciding factor, but the ramifications of such a situation are, as you may well imagine, terrific.

Earlier mention was made of the fact that decedent affairs encompasses other fields of administrative endeavor. It is not possible to enter into detail here, but the connection is accomplished through procurement of neces-

sary services and supplies, arrangements for transportation, disbursements of monies for various purposes, the preparation and submission of the reports and returns required in the administration of the program. Any attempt to cover these aspects of decedent affairs would far exceed both the purpose of this discussion and the time which is available. This does not imply, of course, that these aspects of the program are of any less importance or significance than those which have been discussed. A course of several hours could be devoted to the discussion of each such aspect.

While we have barely scratched the surface in our discussion, I should like to conclude by stating the best way to avoid difficulty in handling decedent affairs is to be thoroughly familiar with and maintain a current library of directives on the subject; act with a deliberateness based on a thorough knowledge of the field; be courteous and sympathetic with the next of kin, being careful to maintain objectivity lest you become emotionally involved and lose your perspective; don't make any commitments which you cannot keep, be wary of oversolicitous relatives and friends of the deceased who can undo hours of careful planning on your part by just a whisper of erroneous advice. Above all, don't hesitate to seek advice if you don't know the answer and, of course, don't throw the panic switch—that is the surest sign you don't know what you are doing.

Advances in Operational Military Medicine*

By

COLONEL T. N. PAGE, *Medical Corps, U. S. Army*†

IT HAS been said that the United States enters each succeeding war with the armamentarium available at the end of the last preceding conflict. This statement certainly will not apply to World War III. The several Armed Forces have been, and continue to be, in a state of revolutionary change. The development of improved weapons, systems and other technical advances have had a marked effect upon strategic, tactical and logistical concepts. Many of these developments have a marked effect upon military medical concepts, organization and procedures. It is most appropriate that practitioners of military medicine, both within the active and reserve establishments, periodically review recent advances in operational military medicine. That is the purpose of this three-day symposium. My remarks will be an effort to highlight some of the more important developments, particularly those of cross-service interest, as a prologue for the presentation to follow.

Despite certain essential and healthy controversy as to the exact nature of future warfare, and the organization and employment of the Armed Forces in the future, the consensus of opinion is that nuclear as well as more conventional weapons may be used freely by both adversaries, within supporting areas as well as within the combat zone proper. As a result, it may be predicted that battle losses will exceed any previous experience and will occur simultaneously in great depth and at points essential to the conduct of both immediate and long-range military operations.

It is equally apparent that the Armed Forces of the future must make maximum utilization of recent technical advances, must achieve greater flexibility and mobility, and must be capable of sustained, decentralized operations anywhere in the world and under a variety of conditions. Other trends indicate a reduction in the support to combat troop ratio, greater dispersion of functional tactical and logistical elements, greater reliance upon aerial lines of communications and a reduction in both personnel and material pipelines. Economy of means will be paramount, not only in the purely military sense, but in the fullest meaning of the phrase. There is a limit to our national resources, including medical, and they must be allocated among the several military and civil claimants on an equitable basis. The ultimate goal should be an integrated team of the Armed Forces, capable of both nuclear and non-nuclear warfare.

These considerations pose a dilemma for several military medical services and have stimulated many important advances in operational military medicine. Let us review some of the more important areas in which advances have been made since the close of World War II.

First is "unification." I believe that real unification has been achieved among the several medical services to a greater extent than in any other facet of the military. This is as it should be. We realize that the magnitude of our joint task in any future war dictates maximum cross-service understanding and cooperation. We can no longer afford to go our separate ways on a unilateral basis. While maintaining essential service identity we are approaching our mutual task with a spirit of unity.

We have made much progress. We have standardized medical materials, publishing a joint catalogue of medical supplies and equipment. We have established the Armed Services Medical Procurement Agency. More

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† Chief, Medical Plans and Operations Division, Office of the Surgeon General, U. S. Army.

recently, all medical stocks in the military wholesale depot system were capitalized by a Single Manager, The Secretary of the Navy. The Armed Services Medical Regulating Office coordinates the movement of all military patients between major geographical areas, insuring maximum efficiency in the use of evacuation and hospitalization means. Cross-service utilization of military hospitals is a reality. Air Force physicians are serving residencies in Army hospitals and the Air Force and Navy are training Army Aviation Medical Officers. These are but a few of the examples of functional unification among the several military medical services.

Our unification goes much deeper than prescribed in the National Security Act of 1947. There is a high degree of understanding between military medical personnel in the active and reserve establishments, the former placing extreme reliance upon the latter in the event of mobilization and deployment. Beyond this, there is a high degree of comradeship between civil and military practitioners of medicine. This unity is increasing as the demarcation between these two general areas of medical endeavor becomes less distinct. It is apparent that in any future war the national medical problem will be met by the total national medical effort, each component contributing fully to the mission of the others.

Military medicine has achieved a true global connotation. The reorientation of strategy, tactics and logistics incident to improved aerial lines of communication, suggests that the Armed Forces may be committed on short notice to any point upon the globe. Our airmen, sailors and soldiers will be required to live and fight at extreme altitudes, upon and deep under the sea, and upon varying types of terrain under extreme climatic conditions. These requirements pose multiple and difficult medical problems which are being pursued by research, clinical and operational medical activities of the three military services. One recent example of the aggressive medical action required within this global concept of military medicine might be cited. On the 18th of April 1957 a newspaper item reported a severe influenza outbreak in Hong Kong. That same day the Surgeon General asked the Chief Surgeon of the Army Forces in the Far East to have an epidemiologist investigate this report. Just 34 days later the Walter Reed Army Institute of Research identified this virus as one different from any known influenza strain. As soon as the virus was identified it was sent to the Biological Control Division of the National Institute of Health and manufacturers were advised by telephone of the significance of this new strain. As a result, a commercial vaccine against this virus was available much sooner than could otherwise be expected and by September 11th was in the hands of our troops overseas and is now in widespread use throughout this country.

We are all concerned over the magnitude of the casualty problem, both military and civilian, in the event of future war. While clinical research to develop improved methods of treatment is continuing on an accelerated scale, it is apparent that it will be difficult to reduce the mortality among wounded reaching military hospitals below the 2.4% that was experienced during the Korean Campaign. Efforts are now being concentrated upon the prevention of serious injury through the use of body armor and other protective equipment; and in improved forward medical treatment with more rapid, less traumatic evacuation. Within the Army, forward medical treatment units are being reorganized to include an increased capability for early resuscitative surgery to stabilize patients requiring further evacuation. Supporting hospitals are capable of dispatching surgical teams to reinforce forward treatment facilities which may be isolated or overwhelmed with casualties. Balanced packets of medical supplies, sufficient for the emergency medical care of increments of 200 casualties, have been developed for aerial delivery anywhere within the combat zone.

The provision of adequate medical service to personnel whose care has been entrusted to

the several medical services requires the utilization of many resources. Not the least of these are the facilities in which patients are housed and cared for or provided outpatient treatments. The problem concerns planning the construction of new facilities and modification of existing facilities and is one of determining the optimum space allowance and arrangement for diagnostic, therapeutic and administrative areas which, when considered collectively, comprise a medical facility.

The Army Medical Service, in planning its hospitals, has divided them into three specific groups or types to meet different missions. First of these is the Theater of Operations type essentially constructed in time of war of the simplest design being shipped abroad as quonset or other prefabricated buildings which can be reassembled or being constructed of locally available materials. Based on our experience during World War II and since that time, plans for these hospitals have been revised and brought up-to-date and are designed to be built in sizes ranging from 25 to 1,000 beds. Mobilization-type hospitals, likewise constructed during wartime, are those intended primarily for the Zone of Interior and are constructed on a dispersed plan utilizing one-storied buildings with connecting corridors. Normally, of timber construction, they are sometimes built of masonry and examples of the latter are two we are currently operating, the Madigan Army Hospital, Fort Lewis, Washington, and the Valley Forge Army Hospital located near Philadelphia. Again, plans for these hospitals have been modernized and have been designed to be built in sizes varying from 250 to 2,000 beds. These hospitals might be constructed on or off Army posts depending upon the area requirement for beds.

The third category of hospitals consists of those permanent type construction based on peacetime requirements and with exception of the smaller sizes are built on a multistory plan. For the reason that we now have some of these hospitals under construction I would like to elaborate on several interesting features in their connection. First of these is that for a given capacity they are built on a uniform basic plan. This concept dates back to 1951 when the Bureau of the Budget approved and the Congress appropriated funds for the construction of a large number of permanent type hospitals for the services, seven of which were to be built by the Army. For the reason that some of these hospitals were of similar size and had a common mission, that of providing on-post medical support to troops, the Bureau of the Budget advanced the proposal that the design of these facilities be based on uniform basic plans. Department of Defense instructions followed and in their implementation each to the three services proceeded to develop plans; the Air Force worked on those hospitals of smaller size, the Army undertook the 250/500 and 500/1,000, bed and the Navy was assigned the 1,000/1,500 bed hospital.

It is noteworthy that these hospitals were designed having a chassis to provide for 100% expansion; for example, the 500/1,000 bed hospital has all of the necessary clinics to serve an additional 500 beds when they are added in the form of multi-storied banks of wards, or by use of mobilization type wards constructed during an emergency.

An illustration of the applicability of the use of uniform basic plans is given by the fact that at four of our installations, Forts Knox, Bragg, Benning and Dix, each will have a 500/1,000 bed hospital of the same basic plan while two other installations, Forts Belvoir and Riley, will have 250/500 bed facilities, likewise of similar plan. These hospitals, as I mentioned before, have functional arrangements which we believe result in efficient operation. I mention one feature we think to be most desirable and that is the location of clinics on the first floor of the hospital to provide use by both outpatients and inpatients without bringing unnecessary traffic into the hospital as would be the case if the clinics were "stacked" on different floors of the building. Incorporated on the first floor are such departments as the X-ray, Laboratory, EENT, Physiotherapy and

Pharmacy. Inpatients requiring the use of any clinic have access through the main elevator system.

Current Department of Defense instructions allow for an annual review of the uniform basic plans for the purpose of meeting the requirements of newly developed techniques and practices, to improve functional arrangement and to achieve maximum economy consistent with sound professional practices.

As warfare becomes more technical and mechanized, medical problems become more numerous and complex. Noise, long a nuisance, is now a serious problem in maintaining the combat effectiveness of individuals. Radiation has been added to the more conventional trauma to which the fighting man is exposed. Whether from nuclear detonations, stored warheads or nuclear power plants, radiation poses special problems which are receiving full consideration by research and operational medical activities within the three services. Other special medical problems are those which are inherent to the production, storage and use of propellants and oxidizers for ballistic and guided missiles. Much more will be required of the individual fighting man of the future and much more will be required of those responsible for his health and effectiveness.

One of the major advances in operational military medicine within the past ten years has been the development of procedure and philosophy related to the care of mass casualties such as might result from a nuclear detonation. While, fortunately, neither the Nation nor the Armed Forces have any valid experience data related to this combined civilian-military medical problem, much has been and is being accomplished. The military has assumed its traditional leadership in this area, and with it a tremendous responsibility. I do not propose to discuss in detail the management of mass casualties. This problem has been the subject of many symposia such as this. I would like to say a bit regarding the philosophy related to the care of mass casualties.

I am concerned over the pessimism which frequently characterizes the approach of even the most responsible and knowledgeable agencies to the problem. One hears much these days concerning the overwhelming casualty problem and the inadequacy of existing medical services to care for them. Such an approach to the problem militates against the development of any sound, realistic measures for reaching a solution. I have confidence in our military countermeasures for preventing massive nuclear attacks upon our cities and military formations. I have a similar confidence in the capabilities of our civilians and troops to utilize passive protective measures to minimize the effectiveness of such strikes as may occur. I also have complete confidence in our combined medical capabilities for caring for all casualties, collectively and individually. It is only through the adoption and promulgation of such a philosophy that the military can provide the leadership which is essential to national survival. This leadership we have provided in the past and we shall continue to provide it in the future.

Now, if I may digress from unification to a single service, I would like to tell you about the medical part of the Army Aviation Program so that you will have some idea of our aims and the means we hope to use to accomplish the same. Our program ties in definitely with our brothers-in-arms, the Navy and Air Force, and should be of interest to you.

Today, the Army is in a period of rapid expansion in the field of aviation. A series of agreements between the Secretaries of the Air Force, the Navy and Department of Defense authorize the Army fixed wing aircraft and rotary wing aircraft (within specific weight limitations) as required to perform its tactical and logistical missions within the combat areas. Army aviation is organic to the several branches of the Army and as such there is no established "Corps of Army Aviation." Revolutionary, tactical and logistical developments within recent years have necessitated this rapid expansion of Army aviation, both as to its missions and the numbers and types of aircraft re-

quired. One important facet of Army aviation, that of Army aeromedical evacuation, is not intended to replace or duplicate support provided by other aviation agencies, to the rear of the combat zone. It is rather an extension of the proven value of aerial evacuation into the forward combat area, where selectivity and evaluation and timelessness of treatment are of the essence.

Air evacuation has come of age. The benefits of air movement of casualties were accepted during World War II and further improved during the recent interval period. In Korea the feasibility of forward battlefield pickup was accepted and anticipated developments indicate that forward air evacuation will be mandatory for routine as well as emergency medical evacuation. Helicopters due to their speed, range and reduced landing site requirements are well suited for the forward battlefield pick-up and consideration is being given to the use of light fixed wing aircraft for rearward and lateral selective evacuation. Currently the Army Medical Service is provided with separate helicopter ambulance detachments for its evacuation mission.

From our success in Korea in the evacuation of the severely wounded by helicopter, the Army Medical Service is continuing to develop pilots and aircraft for use in patients' evacuation. Within the Army we have a number of helicopter ambulance units which are in support of our forces in overseas areas and in support of field operations here in the United States. The use of aircraft by the Medical Service, over and above the saving of life and limb, will add considerable assistance to the problem of rendering prompt and formidable medical care early enough for it to be effective and without increasing the requirements for doctors, facilities and logistics support that will otherwise be required.

The availability of small, reliable helicopters and airplanes, coupled with essential medical control (and don't forget medical control), promises to improve the flexibility, selectivity and economy of forward medical service. Casualties may be moved more rapidly and with minimal trauma to the properly staffed and situated military hospitals. The selectivity inherent to forward aeromedical evacuation permits better utilization of specialized surgical personnel, reduces surgical lags and equalizes patient loads among available supporting hospitals. The medical service is thus insured the same flexibility as the combat elements supported.

With the establishment of an autonomous United States Air Force in 1947 the majority of the qualified flight surgeons elected to remain with the Air Force. Initially, the Army depended completely upon these experienced medical personnel to care for Army aviators on an area basis and auxillary cross-service mission. It became apparent during the Korean campaign, however, that such complete dependence upon the U. S. Air Force Service was unrealistic in an active theater. The tactical disposition of Army aviation elements (fragmented well forward among major tactical units) is such as to widely separate Army aviation personnel and operations from Air Force medical facilities. This experience, plus the rapid growth of Army aviation, has established a real requirement for an Army Aviation Medicine Program.

An Army-wide integrated Army Aviation Medicine Program was implemented with the following objectives and functions:

1. To provide medical examinations for proper selection and the guidance for the subsequent utilization of pilots.
2. To provide clinical care for flying personnel considering the specific problems inherent to flying.
3. To provide a "Care of Flyer Program" to preserve maximum individual and unit efficiency.
4. To provide advice to responsible commanders and boards concerning medical aspects of aviation.
5. To provide and assist in the development with other responsible agencies, of improved policies and procedures for utilization of flying personnel, of aircraft and related equipment.

The Army Medical Service is progressing

rapidly in the technical mission related to Army aviation. We have accepted, in substance, the proven soundness of United States Navy and Air force medical policy and procedures, and have adapted them to the actual requirements of the Army. Selected Medical Corps Officers are sent to the Navy's School of Aviation Medicine at Pensacola, Florida, and to the Air Force's School of Aviation Medicine at Randolph Air Force Base, Texas, for training as aviation officers.

Courses conducted by the Navy and Air Force Schools of aviation medicine are adequate to meet Army requirements, provided graduates of these courses receive orientation and applicatory training in Army aviation medicine before assignment into the field. This orientation is currently four weeks in duration and is given at the United States Army Aviation School at Fort Rucker, Alabama.

No separate field organization is contemplated for the medical care of Army aviation personnel. Available aviation medical officers are assigned to existing medical units and activities and are charged with the care of non-flying as well as flying personnel. Maximum utilization is made of existing professional personnel and medical equipment in accomplishing the Army aviation medicine mission.

Army aviation medical officers are being assigned to divisions, major tactical headquarters, major aviation units and activities, and to station, medical complements responsible for the care of 30 or more Army aviators.

There is no intent within the Army to develop aviation medicine as a rigid, independent medical specialty. Aviation medicine is integrated in the overall medical service mission in the same manner as Army aviation is integrated in the seven branches of the service and major tactical functions in the field.

The emphasis is upon the extension of adequate aviation medicine support to Army aviation, not upon the duplication of service available from other agencies.

Basic medical research and investigations in aviation medicine are considered beyond the scope of the Army aviation medicine program at this time, with dependence placed on that carried on by the Navy and the Air Force. As areas are defined in which research is inadequate, required investigation will be performed by existing Army medical research agencies. These problems will primarily be those peculiar to Army aviation.

The Army Aviation Medicine Program will grow commensurate with the growth and actual needs of Army aviation. The best in aviation medicine service will be provided within the realism of the availability of medical means.

EDITORIALS

Doctors of Diplomacy

MEDICINE is a common meeting ground for all nations. The ills that come to the man in the street also come to the resident of the palace. The pains and discomfort that accompany these ills do not respect the silks and satins of the wealthy nor the rags which clothe the beggars. Ministering to both through the healing art are the physicians and allied sciences of all nations.

Individual doctors have for ages gone into foreign lands to render assistance to the natives lacking medical care. The idea is not new. These doctors usually stay, eking out an existence and expending their last ounces of energy. Witness for one, Doctor Albert Schweitzer; there are many others.

Another note is being played these days; it is not yet a loud note but we hope the vibration will set the strings of many hearts in motion. Herein lies the real song of foreign aid of a different kind than we have had through the clink of dollars. In this movement we can aid our fellow man in a very vital manner. It does not take bankers, although many dollars are involved, some actual, many concealed. We refer to the medical teams which are going into foreign lands to give service.

One of these movements is the MEDICO program mentioned in the May issue of the *Reader's Digest* in connection with Dr. Dooley's article on Laos; the Doctor Dooley of *Deliver Us From Evil* fame.

A trip now under way under the sponsorship of the Baptist WORLD ALLIANCE has for its members: Dr. Stanley Olson, Dean of Medicine, Baylor University; Dr. Robert Hingson, professor of anesthesia and director of anesthesia at Western Reserve University; Dr. John Cleland, a surgeon-obstetrician of the Cleland Clinic, Oregon City, Ore.; and Dr. Charles Black, a chest and tuberculosis surgeon of Shreveport, La. These men are giving their time, not one cent for remuneration. Why all this? A simple desire to help their fellow men is the only answer—their fellow men without regard to race or creed or social standing.

The medical services of the Armed Forces have been rendering similar service in an educational way in their contacts with the medical profession of the many countries in which they have been stationed. This has been going on for years. Relations have been highly satisfactory. The attitude has been "if we can help you we will be happy to do so for the asking." So it is with these medical programs for our international friends.

Doctors engaged in such unselfish missions as those described here are apt to be less suspect and to do more good than professional diplomats, who are often looked upon with a cold and fishy eye by the people of the countries to which they are assigned. They do not get to the hearts of the people, as the doctors on missions of unselfish help and mercy do. Our governmental aid dollars are also apt to be suspect for the same reason. Some ulterior motive is likely to be assigned.

Service through medicine will help cure much of the world's sickness, both mental and physical, imagined and real. We need more of these programs.

Bold Action or Reproach?

SUPER highways and super automobiles stand today as symbols of our material progress. But bitter experience stands as a grim reminder that much too often they become instruments for unforgivable waste of life, health and wealth.

To a governor, every accident, every loss of life and property is a personal concern. With his oath of office goes the responsibility of protecting the people who live, work and travel in his state. With it also comes the obligation to work for safe highways, effective laws and efficient agencies of law enforcement.

We cannot tolerate the violator, big or small. We cannot turn our backs on death.

While leadership in highway safety has to come from the top, effective safety programs will never get off the ground unless they receive active, day-by-day support of all public officials and every individual citizen.

How well are the public officials of your state shouldering the responsibility of maintaining law and order, of preserving life and property? How seriously are they taking highway regulations and enforcement procedures which are just empty words unless faithfully executed? And what about these regulations and procedures? Are they adequate to meet the needs of today's power packed cars and crowded speedways? Is the safety program of your state backed up with practical policies of driver improvement, education, and enforcement?

Those are questions every citizen should ask of the representatives of his local and state government. And if the answers do not satisfy him, it is his responsibility to elect officials who will make the road toll a primary target for improvement.

The national road toll shows that most casualties involve reckless speed. This is where every state's safety program should begin. This is where citizens should ask their most pointed questions. How realistic are the speed limits on your roads? How vigilantly are they enforced? How rigorously are violators prosecuted?

Multiply the heartbreak of one violent death. Multiply the suffering of one broken body. Calculate the dollar cost of each day of slow, pain-wracked recovery. It adds up to a shameful drain on our physical and economic resources. It represents a shameful waste of money that could be used to build schools, sponsor medical research, redevelop communities, strengthen national defense.

Here are a few steps you can take now in your community to put an end to this waste:

First, individually or through your citizens' organizations, make known to your legislators your determination to see a strong highway safety program enacted in your state. Demand the formation of a *working* safety committee which will survey needs, recommend improvements in regulations, and focus public attention on the urgency of the problem.

Second, insist on a program of safety education which begins in the grade schools and continues through a mandatory program of driver training before young people can receive their licenses.

Third, express your support of and willingness to abide by a program of motor vehicle law enforcement without "fix" or "favor."

Fourth, develop within yourself the habits of care, caution and courtesy behind the wheel.

What makes the tragic killing and maiming on our highways ever more tragic is that it is needless and senseless.

There is ample evidence that the tremendous cost in lives and wealth can be reduced. In that evidence is a challenge that is a reproach to our society unless we meet it boldly.

ABRAHAM A. RIBICOFF,
Governor of Conn., in *The Road Toll*, 1958.

Credo Medici Militaris

A MEDICAL officer in the Armed Forces is a specialist in Military Medicine. As such, he is constantly in touch with *dedicated people* who bear true faith and allegiance to the Constitution of the United States and uphold our sacred democratic ideals wherever the American flag flies.

The fundamental principles of our Republic were spelled out in the Constitution

and guaranteed by the Bill of Rights. They were reaffirmed at Gettysburg and, more recently, in Korea. In the interim, they emerged triumphant from two World Wars. Men and women of high principle on active military duty in our Armed Forces continue to support and defend our way of life against all enemies, foreign and domestic.

When called upon in time of national peril they have shed their lives like autumn leaves that Freedom should not perish in this Nation, or even from the face of the earth. In time of peace they keep faith with our national heritage and uphold the sanctity of the individual and thereby insure the concept of human dignity for generations yet unborn. Many such people are as *dedicated* today as were the Founding Fathers of our Constitution in colonial times. Their quiet, unswerving devotion to duty is a bulwark against our enemies, both overt and covert, now and in the future.

A career doctor on active duty in the Armed Forces of the United States is privileged to serve to the best of his professional training and ability officers, enlisted men and their dependents in all branches of the military service at home and abroad. This is a sacred trust which requires wisdom and grace and strength and, above all, humble dedication.

The Spirit of America must march onward and forward. A career in Military Medicine is an honorable means of contributing to that noble purpose.

CAPTAIN CHRISTOPHER C. SHAW,
Medical Corps, U. S. Navy.

Appointment

THE Executive Council of the Association of Military Surgeons of the United States at its May 21 meeting, acting under the provisions of Section 1, Article VII of the By-laws of the Association elected Dr. Leroy E. Burney, Surgeon General of the U. S. Public Health Service to the office of Third Vice-president which was vacant due to the recent death of Dr. John W. Cronin.

NEW YORK CHAPTER MEETING

The spring meeting of the New York Chapter was held at the U. S. Public Health Hospital, Staten Island on June 5. After cocktails and a delightful dinner, Doctor John W. Bowden, Superintendent of the hospital, turned the meeting over to his staff who presented a very timely symposium on staphylococcic infections in hospitals.

Some of the measures taken to combat these resistant strains of the staphylococcus were presented. An educational program for all employees in hospitals was recommended and also a strict enforcement of the measures of asepsis as practiced in pre-antibiotic days.

Around the World

(Ser. II, No. 23)

By

CLAUDIUS F. MAYER, M.D.

WESTERN Ontario witnessed a peculiar small epidemic which broke out at a station of the Royal Canadian Air Force and lasted ten days of last year's midsummer when the weather was very hot and humid. Many persons were affected to some degree but only about fifty needed hospitalization. The acute illness started with some suddenness, and made the sick person unfit for about 10 days. There was sore throat, headache, stiff neck, stiff back and malaise, with frequent pain in the limbs, chest and abdomen, often with nausea, lack of appetite, colic, sometimes diarrhea and vomiting. The epidemic probably consisted of four different varieties of disease: —herpangina, Bornholm's disease, aseptic meningitis, and summer grippe—all of which are varieties of the *Coxsackie virus disease,* at least that is the suggestion offered by a doctor of the Royal Canadian Air Force. Attempts to isolate the virus met with failure.

It was suggested that Western Australia was afflicted by an *epidemic of skin lesions* due to penicillin-resistant staphylococci. Private sources also indicated that similar outbreaks of *furunculosis* may have occurred at various places in *New South Wales.* Out of 85 isolated strains of Staphylococcus aureus, 63.5% were resistant to the antibiotic. It was also detected that the nasal carriers of penicillin-resistant staphylococci have doubled among the blood donors of Sydney during the past few years. Elsewhere also; thus at the University of Glasgow, bacteriologists found that *bacteriostatic agents* such as chloramphenicol *may help bacteria to survive* rather than to die under conditions of bacteriostasis. The situation is analogous to the one seen in drying of bacteria. Slow drying causes death of many species while freeze-drying maintains the viability of many microbes.

Studies of Ida Mann, Australian ophthalmologist, show that *trachoma is widespread in Western Australia and in the Territory of Papua and New Guinea.* The disease was not endemic in the area originally, but it was introduced by European and Chinese settlers. The prevalence of trachoma now may vary among the natives from 8.6% (at the Marshall Bennett Islands) to almost 90% (at Telefomin). At some places the trachoma is a "pure" trachoma, without complications; at other sites, a certain amount of secondary infection and mucopurulent conjunctivitis is present. The most severe type is found at the Gazelle Peninsula (Telefomin) which might have been the first settlement of the imported trachoma. From there, it spread to other islands and to the main land, to Western Australia where it is most frequent in the Kimberleys. The disease is also detectable in areas of Australia which have no free contact with aborigines.

Trachoma is still a world-wide disease. The atypical virus (Chlamydozoon trachomatis) and the keratoconjunctivitis it produces are still imperfectly understood by virologists and ophthalmologists alike. The clinical and epidemiological picture of trachoma is different at various parts of the world, but it is impossible to say, in the present state of our knowledge, whether or not—in addition to geological and climatological factors and social habits—different strains of the virus may cause the variations in the clinical picture.

There has been some dispute about the *tuberculosis situation in the Cook Islands.* These islands belong to the territories of New Zealand, and it is expected that the administration should allot sufficient funds for the campaign against domestic tuberculosis (critics do not like New Zealand to provide an annual sum of one million pounds to

the Colombo Plan). It has been requested that active tuberculosis cases be immediately isolated and not be left to infect healthy members of the usually overcrowded household. There are at present no facilities for a successful preventive campaign. The Rarotonga Sanatorium is overloaded though it should be used only for surgical cases and for those requiring special treatment. For this and for other reasons among the Australians there is a great resentment against the Colombo Plan, the idealistic conception which was brought into operation in 1950.

In a new "Colombo Plan" for Africa, which was drawn up by a Commission for Technical Cooperation in Africa South of the Sahara (Headquarters: London), six European "colonial" powers and the African free countries agreed some time ago on supplying technical and economical aid to Africa, without attaching any politics to such an aid. Considering the controversies currently seen in the Dark Continent, there is not much chance left to put the plan into effect.

In the Territory of Papua and New Guinea, the main element in an attack on sickness is the *nursing service, especially the midwives.* It is the Roman Catholic St. Marie Therese Maternity Hospital at Koki, near Port Moresby, where Papuan girls are trained to a high level as midwifery assistants in the service of their own people. The hospital, which now has 14 beds and a nursery wing, started in 1950. Some of the trained assistants recently received midwifery certificates from the Director of the Public Health of the Territory.

The French Academy awarded the Raoul Follerau Prize (about 700 pounds) to Sister Othilde, a Catholic nursing sister in charge of the native section of the Ducos Hansenian Sanatorium at Noumea, New Guinea. The sister contracted leprosy after her arrival in 1933, but she is now cured. A few years ago she was decorated with the legion of Honor. The *Mission in the Mud,* established on the Upper Bamu River, in the Gulf of Papua country about 20 years ago, is now provided with a small hospital for natives. It is named the Dr. Vernon Memorial Hospital, in memory of an Army medical officer who rendered a great humanitarian service to the natives of this region. The opening ceremonies ended with a general physical examination of all those who attended the festivity. It was a strange spectacle that not a single case of leprosy was found among the people of the Bamu District, while there were numerous cases among natives who came from more healthy neighboring areas.

In the *highlands of New Guinea* is the great *Wahgi Valley* where in certain areas the *natives go berserk at times,* becoming hysterical and attacking their fellows savagely. An administrative officer of the government recently noted that these outbreaks of insanity come in July and August. It seems that a connection can be established between the mad behavior and the eating of certain mushrooms which grow at that time of the year at the foot of certain trees. Samples of the fungi were sent to Port Moresby where they were found to be of a very rare genus. For further study the samples were sent to England.

The smallest country of Central America but the most densely populated in the world is *El Salvador,* called by its native inhabitants Cuzcatlán, the "Land of Precious Things". It is located between Guatemala and Honduras, and its western border is formed by the Pacific Ocean. The country is 34,125 square kilometers, and in 1955 it had 2,193,425 inhabitants of whom 3% were Indians, and the rest were mixtures. The people speak Spanish, and some Indians are still using the Nahuatl language. El Salvador has a National University where physicians are also graduated. The capital is San Salvador. It has several general and special hospitals such as the Hospital Rosales, Hospital Bloom for children, Sanatorio Nacional (for tuberculosis patients), Asilo Salvador (for the insane), Hospital de Maternidad, Hospital Militar, etc. In the whole country, sixteen larger medical institutions and a number of charity and welfare establishments are located. The country is famous for its special efforts to promote public welfare and public health. Most of the work of the Public Health

Department was concentrated upon the extermination of malaria by all available means (including drainage of swamps).

El Salvador is the wealthiest Central American country since it has an intensive development of agriculture, and practically all parts of the country are cultivated with the most modern machinery and tools. The country produces coffee, sugar, indigo, cotton, etc. The most important of its medicinal products is the "Peruvian" balsam which in fact is a product of the El Salvador balsam tree. It is now chiefly used domestically in the manufacture of soaps and drugs. Since a large percentage of the population of the country is living in scattered villages and hamlets, without easy access to doctors and hospitals, much of the ancient Indian knowledge of the medicinal power of plants is put into "modern" practice.

There are about 36 recognized medicinal plants in El Salvador which are in steady use as medicines of the people. The bark of an olive tree provides an infusion against intermittent fevers. The root of another plant (Ruellia) is used as a diuretic and substitute for ipecac. Other plants are used against intestinal pains, in hemorrhages, for the cure of alcoholism (Cortalaria), for dysentery (Ishacaca), against snake bites (Euphorbia), as vermifuges (Valerianoides), or antisyphilitic remedies (Gnaphalium). Many of the tropical fruits and other trees also have medicinal virtues, and have been used by the natives as drugs for many centuries. The country also abounds in mineral waters. La Toma has large mineral springs, and became famous as the Vichy of El Salvador. Several thermal springs, as The Ausoles, are excellent in rheumatism and arthritis.

Brazilian dentists are worried about the condition of teeth of the children of their country. A recent study of the dentition of 3,000 young boys and girls in the schools of Rio de Janeiro, Aímores, and Baixo Guandú (Espíritu Santo) showed that the *D M F* (decayed, missing, filled) *index* of the school children is much higher than it was in Grand Rapids, Michigan, before the introduction of fluoridation of the public water supplies. An average Brazilian child of six years has about two (1.92) of his teeth decayed, missing or filled, while in a 16-year old the average damaged teeth number about 16.

In *Tristan da Cunha,* the years of civilization brought much toothache and *dental caries.* Colonial officers of Great Britain, who studied the mouths of the island's population, came to the conclusion that only the introduction and consumption of the "sophisticated" food articles (refined flour, sugar, and alcohol) could be blamed for the dental decay of the island's primitive inhabitants. Otherwise, the general health of these people is good. There are no signs of endocrine disorders, rickets, scurvy, hemeralopia, xerophthalmia, or of other nutritional deficiencies. There are said to be no tumors, no tuberculosis, no venereal diseases nor heart disturbances. A mild dysentery is the only serious disease. Epidemics of "common cold" invariably appear whenever someone from the outside visits the island. The fluoride content of the drinking water and of the edible fish is of a low level.

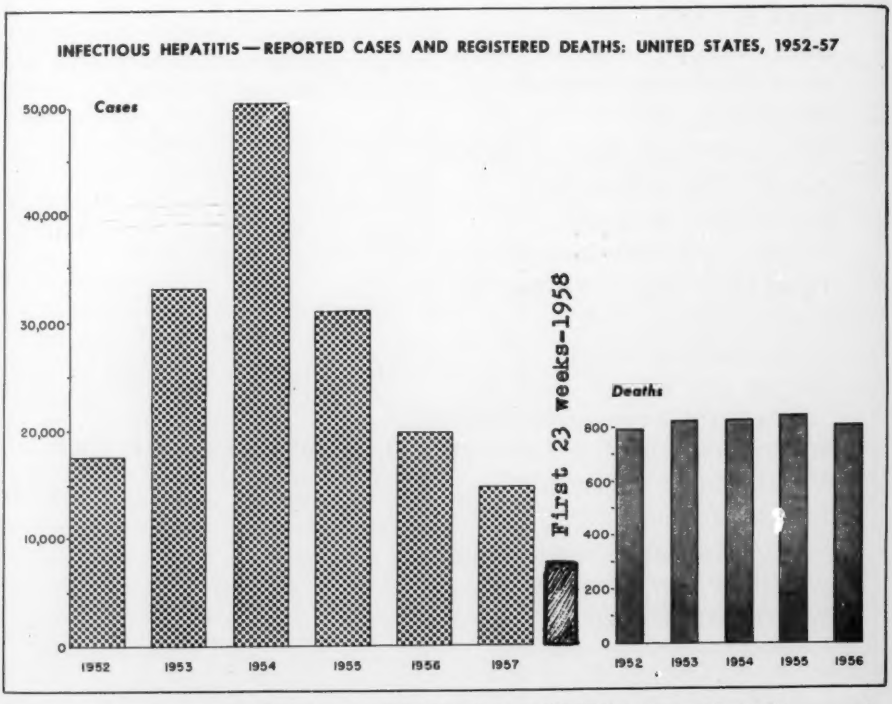
At another part of the world, *in London,* a survey of the 5-year old *schoolchildren* showed that their *dental condition* was much *better* during 1943-1947, i.e., the war years than either before or afterwards. The improvement is attributed by the Medical Research Council to the higher calcifying quality of the supplemental food that expectant and nursing mothers and infants received during the time of food shortage and rationing.

One of the most modern urological departments opened last October at the *St. Camillo Hospital in Rome.* It is named after Marcello Malpighi, the famed Italian describer of the kidney structure in the 17th century. The new department has four rooms for endoscopy, two for cysto-radiology, and is provided with an artificial kidney of the Dogliotti-Caporale type. A set of operating rooms, one of them for urological radiosurgery, enables the new institution to do all types of modern surgical work. By the way! Another modern Roman institution is the *Physiotherapeutic Clinic* which, from contri-

butions of Austrian doctors, was built in the basement rooms of the Belvedere Palace *in the Vatican.*

In the *Portuguese Army,* the lungs of 34,445 soldiers were fluorographically examined in the course of 1955. The percentage of pulmonary radiograms showing tuberculosis was 0.94%, or 9.4 per thousands of recruits. Mass fluorography is still favored in the Russian Army, too. Recent articles indicate that the best method is to have an antero-posterior (AP) as well as a postero-anterior (PA) exposure for the chest fluorogram. Russian military surgeons claim that in this way 11% more of the cases of lung tuberculosis were detected.

At a meeting of the Medico-Scientific Society of Phychiatrists at the Karl Marx University of Leipzig, the professor of the Greifswald Neurological Clinic discussed the need for the establishment of consultation centers for sex problems where young people could obtain advice and solution of their various troubles. Such consultation should not be mixed up with the work of the prenatal and child welfare clinics. On the other hand, care should be taken that such centers should not get the dubious distinction of being consultation centers for sexual perverts (as had happened to the now defunct posts of the Sexological Institute of Magnus Hirschfeld in 1919). . . . *Multa paucis!*



MORBIDITY AND MORTALITY *Weekly Report,* USPHS, JUNE 13, 1958

SUSTAINING MEMBERS

It is a privilege to list the firms who have joined The Association of Military Surgeons as Sustaining Members. We gratefully acknowledge their support.

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ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3rd of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.
Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

ARMED FORCES FILMS

Motion picture films (16 mm.) are available for free public showing, including television, as a public service. The films cover a wide variety of interests.

Your Association Headquarters will be glad to assist you in planning for a showing of a film if the topic of interest is given. Films, of course, are available through the various service libraries, where catalogs also are maintained.

Organizations interested may obtain a catalog from the Department of Defense, PIO, Room 2E791, Pentagon, Washington 25, D.C.

MEDICARE

The $80 million figure requested for the Medicare program for the next fiscal year has been attacked by Congress as excessive. In the belief that better utilization can be made of the military beds that are available in many areas there has been a recommendation that the funds to be appropriated by Congress be reduced to $60 million. This will have the effect of forcing dependents to use military hospitals in those areas where such facilities are available.

Over a million cases have been processed under the Medicare program. Some figures are available for certain types of cases: maternity cases, $224; appendectomies, $335; and respiratory cases, $164.

The cost of the first million cases for Dependents' Medical Care was approximately $90 million.

Army

Surgeon General—MAJ. GEN. SILAS B. HAYS
Deputy Surg. Gen.—MAJ. GEN. JAMES P. CLOONEY

ASSIGNMENT IN SGO

Dr. John B. Youmans has resigned his office as Dean of Vanderbilt University Medical School and has been appointed Technical Director of Research in the Office of the Surgeon General of the Army. He will assume his new duties on a full-time basis September 1.

In this position he will provide technical guidance in research and development in medical, dental, veterinary and allied sciences.

A retired Army Medical Corps Colonel, Dr. Youmans served in China, the Pacific and the European Theaters in World War II, and was awarded the Legion of Merit and the French Legion of Honor. During World War II he was also in charge of the Nutrition Division in the Surgeon General's Office.

CHANGES IN THE ARMY SURGEON GENERAL'S OFFICE

With the impending retirement of Major General Paul I. Robinson, Medical Corps, U. S. Army, who has been Executive Director of the Office for Dependents' Medical

Care (Medicare) changes are being made in the Office of the Surgeon General.

Colonel Floyd L. Wergeland, MC, who has been Chief of the Personnel Division will replace General Robinson. Colonel Byron L. Steger, MC, who has been Chief of the Training Division will become Chief of the newly organized Personnel and Training Division.

The Surgeon General, Major General Silas B. Hays states that the change is "to provide for more efficient assignment, career planning and training of Army Medical Service military personnel."

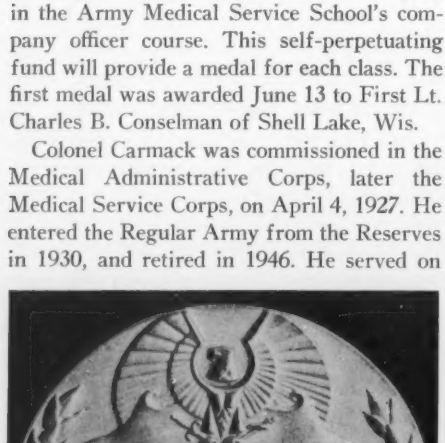
CARMACK MEDAL

Colonel Joseph Carmack, a retired Army Medical Service Corps officer who resides in San Antonio, Texas, has endowed a special medal for presentation to the career officer of his corps making the highest scholastic rating in the Army Medical Service School's company officer course. This self-perpetuating fund will provide a medal for each class. The first medal was awarded June 13 to First Lt. Charles B. Conselman of Shell Lake, Wis.

Colonel Carmack was commissioned in the Medical Administrative Corps, later the Medical Service Corps, on April 4, 1927. He entered the Regular Army from the Reserves in 1930, and retired in 1946. He served on the special staff under General Eisenhower at Supreme Allied Forces Headquarters in North Africa, and later in Italy with the Headquarters of the Mediterranean Theater of Operations. He holds the Legion of Merit, the Degree of Knight Commander of the Order of the Crown of Italy, Italian War Cross of Military Merit, Imperial Military Order of St. George of Corinthia, American Campaign Medal with Bronze Battle Star, and the American Defense Service Medal with Foreign Service Clasp.

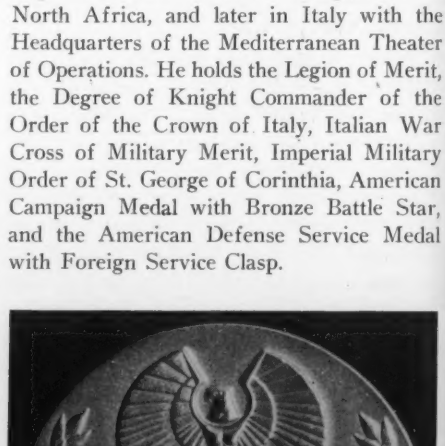
U. S. Army Photo

COL. JOSEPH CARMACK, USA, RET.



U. S. Army Photo

CARMACK MEDAL—FRONT VIEW



U. S. Army Photo

CARMACK MEDAL—BACK VIEW

HONORED

Colonel Floyd L. Wergeland, MC, Chief, Personnel Division, Office of The Surgeon General, has been selected for membership in the Epsilon of California Chapter, Alpha Omega Alpha Honor Medical Society which was organized last year at the College of Medical Evangelists, Los Angeles, California.

He graduated from that college in 1932. He entered on active duty in the Army in April 1933. His alma mater in recognition of his outstanding career has elected him to be one of the three physicians who graduated previous to the formation of the Epsilon Chapter.

TO COMMAND BROOKE HOSPITAL

Brig. Gen. Clement F. St. John, MC, commander of the Landstuhl Army Medical Center in Germany has been assigned to Brooke Army Hospital, Fort Sam Houston, Texas.

HOSPITAL PLANNING

Specially designed plastic building blocks are used by Hospital Administration students at Brooke Army Medical Center to better approach the problems of hospital planning.

Under the direction of Lt. Colonel Seth H. Linthicum, Jr., Instructor in the Department of Administration at the Army Medical Service School, officer students use a model hospital which affords study of both horizontal and vertical hospital arrangements.

When these blocks are assembled the students have the entire multi-story plan, with all wings properly numbered and labeled. Dismantled each floor of each wing can be used separately to make an analysis of the most appropriate and efficient arrangement of necessary facilities. Each functional area or hospital department can be studied for its own needs and for its interrelationships with other hospital services.

U. S. Army Photo

Studying hospital plans are (L to R) CAPT. J. B. CULBERTSON, MAJ. F. S. WHITTINGTON of Canada, MAJ. FLOYD E. VAN SICKLE, and LT. COL. R. F. LERG.

DENTAL CLINIC NAMED

Dr. John Sayre Marshall, Civil War soldier, eminent dental educator and the first senior member of the U. S. Army Dental Corps, was memorialized at Fort Dix, N.J., on June 7 in the naming of the new post dental clinic at that station.

Representing the Office of The Surgeon General of the Army was Col. Leland G. Meder, Assistant Chief of the Dental Division. Colonel Meder made the memorial address following an introduction by Col. Edwin Van Dervort, Post Dental Surgeon.

The exceptional accomplishments in American dentistry contributed by Dr. Marshall were cited by Colonel Meder as an inspiration for today's Army dentists in their efforts to give the finest professional care to their patients.

"Too many of our people are apt to loose sight of our objectives as doctors of dentistry", Colonel Meder said. "One of these objectives is service to our fellow men and each individual should do for his neighbor what he would like done to him under similar circumstances.

"Satisfaction from a professional career, well conducted, is our greatest reward for this service. It more than compensates for any feeling of disappointment we might have that we cannot all hope to accomplish in our days of service the outstanding results Dr. Marshall achieved throughout his life."

A native of Tunbridge Wells, England, Dr. Marshall came to this country in early

childhood and grew up in De Witt, Onondago County, New York. He enlisted in Company G, 2nd N.Y. Cavalry in 1864. After demobilization he obtained a medical degree and studied dentistry with local practitioners, passing the examinations established at that time for determining the qualifications of practicing dentists.

But he became best known as a teacher in this field, holding responsible faculty posts with Northwestern University, Syracuse University and the American College of Dental Surgery. Upon recommendation of the executive council of the National Dental Association, he was named by the Army Surgeon General Sternberg in February 1901 to the governing body of the newly authorized Corps of Dental Surgeons. He was made president of the board and in April, 1911 was commissioned a first lieutenant, the highest rank then possible for a dental officer.

He retired from the Army in June, 1911 and at that time was advanced in grade to captain because of his Civil War service. He continued his teaching and research at the University of California, Berkeley, after his retirement from the Army and died in that city on November 20, 1922 at the age of 76 years.

PAINLESS DENTAL INJECTIONS

Painless dental injections by the use of a jet injector may in time supplant the needle for an anesthetic. The technique was reported in "Jet Injection Local Anesthesia in Dentistry," May issue of the *Armed Forces Medical Journal*.

A disadvantage appears to be some bleeding although this can be readily controlled by sponge pressure.

The use of the hypospray for mass inoculations has been previously reported.

U. S. Army Photo

Dental patient receiving local anesthesia by use of U. S. Army's experimental jet injector.

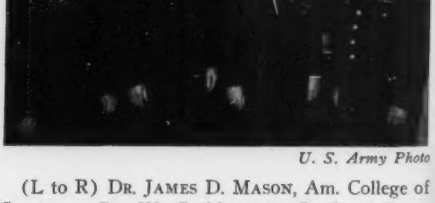
MEDICAL CONFERENCE

The Second Army Civilian Medical Consultants and Hospital Commanders Conference was held on May 28-29 at Fort George G. Meade, Maryland.

Called by Colonel Francis P. Kintz, The Second Army Surgeon, the meeting was the second annual event of the type within the Second Army area and was designed to assist hospital commanders in maintaining a high standard of patient care and in developing a full appreciation of the civilian consultants' program through which outstanding physicians and specialists are made available to the Army.

CIVILIAN CONSULTANTS

Civilian Consultants to the Fifth U. S. Army Surgeon, Colonel George E. Leone, recently met with him to discuss possible improvements in techniques and services and Medical Service matters in general. Three of the four physicians on the committee of ad-



U. S. Army Photo

(L to R) Dr. James D. Mason, Am. College of Surgeons; Dr. W. G. Maddock, Prof. of Surg., Northwestern Univ.; Dr. Roy R. Grinker, Clin. Prof. of Psychiatry, Univ. of Ill.; Dr. George E. Leone, Fifth Army Surg.

visors are shown. Dr. Harold Lueth, Clinical Professor of Internal Medicine at the University of Illinois, was not able to be present.

RETIRED

Colonel Agnes A. Maley, one of the four full colonels of the Army Nurse Corps, retired on June 3 at Brooke Army Medical Center where she has been Director of Nursing Activities.

Retirement ceremonies were held by Major General William E. Shambora, the Center Commander, with an honor guard for Colonel Maley. In her 28 years of service as an Army nurse she has had many important assignments among which were Chief of the Nursing Service in the China, Burma, India Theater from 1944-46, Chief of the Nursing Service, U. S. Army, Europe, from 1951-55, and Chief of the Nurse Personnel Section, Office of the Surgeon General, also Chief Nurse of the Third Army and Sixth Army.

She plans to live at her home, 813 Eventide Drive, San Antonio, Texas.

MALE NURSE AT WEST POINT

First Lieutenant Edwin G. Emery, first Male Nurse to be assigned to the Army hospital at West Point comes from South Dakota. He is a graduate of both the McLean School of Nursing and the Massachusetts General Hospital, and has completed the Anesthesia Course at the Mayo Clinic. During World War II he served with the Air Force in Europe and was awarded the Air Medal. He wears the ETO Ribbon with six Battle Stars.

JOINS RA MEDICAL CORPS IN BERLIN

Captain Oscar S. De Priest III, grandson of Oscar De Priest who served three terms in Congress as representative from Illinois was recently sworn in as captain in the Medical Corps of the Regular Army at Berlin, Germany.

He attended Phillips Andover Academy before entering Harvard University where he received the B.A. degree summa cum laude in 1950, and his medical degree in 1954.

U. S. Army Photo

(L to R) MAJOR E. F. STARR, AGC, USA; CAPT. O. S. DE PRIEST III, MC, USA; BRIG. GEN. GEORGE T. DUNCAN, CG, Berlin Command.

He was a second year resident in surgery in Massachusetts General Hospital when he entered the Army in 1956.

KELLER LECTURE

The sixth annual William L. Keller Memorial Lecture was given at Walter Reed Army Medical Center by Dr. Michael E. De Bakey, Chairman and Professor of the Department of Surgery, Baylor University College of Medicine, who spoke on the subject, "Changing Concepts in Vascular Surgery."

The Keller Memorial Lecture was established in 1952 in honor of Dr. William L. Keller, noted surgeon of the Army Medical Corps. Colonel Keller retired from the Army in October 1935 and now lives at 2930 Foxhall Road, NW, Washington, D.C.

ADVANCED STUDY

Dr. David McKenzie Rioch, Director of the Division of Neuropsychiatry at the Walter Reed Army Institute of Research, has been granted a leave of absence to accept a 1958-1959 appointment as a member of the Institute for Advanced Study at Princeton, N.J.

Admission to that institution is by vote of the Faculty. Dr. Rioch intends to devote his entire time to one project, "The Anatomy of the Striatum and Its Relationship to the Cortex."

Since 1951 D. Rioch has been with the Neuropsychiatry Division at the Walter Reed Institute, and during the past seven years he has achieved international recognition for his outstanding contributions in this field.

Navy

Surgeon General—Rear Adm. Bartholomew W. Hogan
Deputy Surgeon General—Rear Adm. Bruce E. Bradley

RESERVE CONSULTANT BOARD MEETS

A group of outstanding civilian physicians met at the National Naval Medical Center, Bethesda, Maryland, recently to discuss the Navy's Graduate Medical Training Program with the Surgeon General and his staff.

Each member of the Board represented one of the medical specialties, and the majority of them, in addition to being recognized specialists, hold teaching positions at well-known medical schools throughout the country.

The Navy's Graduate Medical Training Program was planned and instituted at the close of World War II by several of the members of the Board who were Rear Admirals, Commodores and Captains in the U. S. Naval Reserve, on active duty at that time. Since their release from active duty they have continued their interest in the Navy and have given freely of their time and advice, visiting the Navy's medical facilities at the request of the Surgeon General, to review the training programs. The high standards of the training have produced well-qualified naval medical officers, who in turn provide better patient care. The program has been a very important feature of the professional career pattern of the Navy.

Those attending the meeting were: Winchell McK. Craig, M.D. (Chairman), Professor of Neurosurgery, Mayo Foundation, University of Minnesota; Joseph S. Barr, M.D., Professor of Orthopedic Surgery, Harvard Medical School; F. J. Braceland, M.D., Director of the Institute of Living, Hartford, Conn.; Gordon M. Bruce, M.D., Professor of Clinical Ophthalmology, Columbia University College of Physicians and Surgeons; John Godwin Downing, M.D., Professor Emeritus in Dermatology, Tufts Medical School; William J. Engel, M.D., Urologist, Cleveland Clinic; Paul Greeley, M.D., Head of Plastic Surgery Department, University of Illinois; Donald Hale, M.D., Anesthesiologist, Cleveland Clinic; Richard A. Kern, M.D., Professor of Medicine, Temple University; George M. Lyon, M.D., Pediatrician and Manager of Veterans Administration Hospital, Huntington, W.Va.; Daniel F. Lynch, D.D.S., Oral Surgeon, Washington, D.C.; Alphonse McMahon, M.D., Associate Professor of Medicine, St. Louis University; William Lister Rogers, M.D., Clinical Professor of Surgery, Stanford University; Wendell G. Scott, M.D., Clinical Professor of Radiology, Washington University, St. Louis; Benjamin Tenney, Jr., M.D., Professor of Obstetrics and Gynecology, Harvard Medical School and Boston University; Shields Warren, M.D., Professor of Pathology, Harvard Medical School; M. G. Westmoreland, M.D., Pathologist and former official of the Council on Medical Education and Hospitals of the American Medical Association.

RECEIVES D.SC. DEGREE

Rear Admiral Edward C. Kenney, MC, was the recipient of the Honorary Degree of Doctor of Science conferred on him by Doctor A. Blair Knapp, President of Denison University, Granville, Ohio, at the Annual Commencement Exercises on June 9.

Admiral Kenney was a student at Denison from 1923 to 1926 when he received his Bachelor of Science Degree before entering the Medical College of the University of Cincinnati to study medicine. He is presently on duty in the Bureau of Medicine and Surgery as Assistant Chief for Personnel and Professional Operations.

He is a member of the American Medical Association, the Association of Military Surgeons, a Fellow of the American College of

Physicians, and a Diplomat of the American Board of Internal Medicine.

NEW DENTAL COURSE

The new officer correspondence course, *U. S. Naval Dental Clinic* Administration (NAVPERS 10401), will be available on July 31 to members of the Dental Corps and dental officers of the Naval Reserve. It is designed to prepare naval dental officers for greater responsibility in providing dental care to personnel of the Navy and Marine Corps and also provides a fundamental background necessary to meet the requirements of command.

Applications for enrollment should be forwarded on NAVPERS form 992 (Rev. 2-56), with appropriate changes in the "TO" line, via official channels to the Commanding Officer (Code5), U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md.

NURSE CORPS

The Navy Nurse Corps is now in its 51st year, having celebrated its 50th anniversary on May 13. During World War II there were 11,000 nurses on active duty in the Corps. The present strength is approximately 2,100. The new Director of Nurses is Captain Ruth A. Houghton who succeeded Captain Leona Jackson on May 1.

RETIRED

The following Medical Service Corps officers were placed on the retired list of officers of the Navy, effective June 1:

Commander A. Bowdle, Jr.; Lieutenant Commanders George W. Lewis and Charles R. Wannemacher. Commander Wannemacher plans to take up residency in St. Petersburg, Fla.

Lieutenant Commander Louis S. Ezell, MSC, retired on May 1.

STUDIED MEN ALOFT

An open basket STRATO-LAB gondola balloon flight launched at Crosby, Minn., by the Navy on May 6 gave an astronomer and an astronaut an opportunity to observe the twinkling of the stars and gave Captain Norman L. Barr, Medical Corps, U. S. Navy, an opportunity to observe the reactions of the two men in his laboratory at the National Naval Medical Center, Bethesda, Maryland.

Instruments attached to the two men sent data to the ground and these signals were relayed to Captain Barr by telephone line. Thus he was able to observe the men a thousand miles away and, to record the data on tape. The rate of respiration, the heart rate, the body temperature, the blood pressure, the respiratory volume and the EKG were some of factors relayed. Doctor Barr noticed in one of the men that as soon as the pressure breathing apparatus was cut in there was an increased conductivity of the electric impulse across the septum of the heart. This lasted for about 1½ hours but was not a steady finding during the time observed. Examination of the men before and after the flight showed no cardiac irregularity.

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. OLIN F. MCILNAY

LEGION OF MERIT AWARD

Major General Harry G. Armstrong, USAF (MC), was presented the Legion of Merit Award with Second Oak Leaf Cluster on May 28 by Major General Dan C. Ogle, Air Force Surgeon General.

General Armstrong received the award for exceptionally meritorious conduct in the performance of outstanding service to the United States as Surgeon of United States Air Force in Europe from July 3, 1954 to November 20, 1957.

General Armstrong who was formerly the Surgeon General of the U. S. Air Force is the author of "Principles and Practices of Aviation Medicine" which is widely used throughout the world as the standard text on aviation medicine. He is a past president of the Association of Military Surgeons.

ASSIGNMENTS

Colonel Raymond T. Jenkins, USAF (MC), was recently assigned to the Office of the Surgeon General as Deputy Director of Plans and Hospitalization. His previous assignment was Surgeon of the Twelfth Air Force.

Lt. Colonel Hayes M. Sadler, USAF (MSC), has replaced Lt. Colonel John C. Delahunt, USAF (MSC), as Executive Officer for the Directorate of Plans and Hospitalization. Colonel Delahunt has been assigned as Executive Officer for the Surgeon of the U. S. Air Forces in Europe, Wiesbaden, Germany.

Lt. Colonel Nathan Cooper, USAF (MSC), has been assigned as Deputy Chief of the Medical Education Division to succeed Lt. Colonel James T. Haden who has been assigned to the U. S. Air Force Hospital in Wiesbaden, Germany.

HONORED

Colonel Harry A. Gorman, chief of the Veterinary Research Division, School of Aviation Medicine, Randolph Air Force Base, Texas, has been elected a charter fellow of the American Board of Laboratory Animal Medicine.

He has gained prominence for developing an artificial hip joint. His work was reported in an article in MILITARY MEDICINE, Vol. 121:91, August 1957, entitled "A New Prosthetic Hip Joint." This procedure which was originally done with dogs has been adapted to the human being.

Public Health Service

Surgeon General—LEROY E. BURNEY, M.D.
Deputy Surg. Gen.—JOHN D. PORTERFIELD, M.D.

DOCTOR BURNEY HONORED

On July 1 a testimonial luncheon was given at the Mayflower Hotel, Washington, D.C., in honor of Dr. Leroy Burney who had completed service as President of the 11th World Health Assembly held in Minneapolis, Minnesota.

Senator Lister Hill (D. Ala.) presented a plaque to Dr. Burney. The event, co-sponsored by the District of Columbia Medical Society and the Washington Board of Trade, was attended by many distinguished persons.

The World Health Organization, now ten years old, has 88 countries as members. Better health for the world is its aim and certainly there is room for improvement in many areas.

APPOINTMENT

Dr. James V. Lowry has been appointed as Chief of the Bureau of Medical Services with the rank of Assistant Surgeon General to succeed Dr. John W. Cronin who died suddenly on March 26. Dr. Lowry has been Deputy Chief of the Bureau since November 1957.

The Bureau of Medical Services administers the Public Health Service Hospitals, the Indian Health Service, Foreign Quarantine, the Hospital Survey and Construction Program, and research activities concerned with the Nation's dental and nursing resources.

Dr. Lowry, a native of Wisconsin, graduated from the University of Wisconsin with high honors and later received his M.D. from the University's School of Medicine. He entered the Public Health Service as an intern at the hospital in New Orleans in 1937. He is a diplomate of the American Board of Psychiatry and Neurology, a member of the American Psychiatric Association, American Medical Association, Alpha Omega Alpha honorary medical society, and past president of the Kentucky Psychiatric Association.

CONFERENCE ON PUBLIC HEALTH TRAINING

Sixty-five representatives of professional and educational groups will attend a national conference on public health training to be held in Washington, D.C., July 28-30 under

the sponsorship of the Public Health Service. Dr. Berwyn F. Mattison, executive secretary of the American Public Health Association, will be chairman of the meeting.

The meeting will review responsibilities of local, State and Federal agencies for the training of public health personnel. The purpose of the traineeship program is to help alleviate the acute shortage of trained personnel in public health agencies.

RADIOACTIVITY IN MILK

A year-long pilot study has shown the radioactivity in all milk examined to be well below the permissible limits agreed upon by the National Committee on Radiation Protection and Measurement. Milk samples taken in five geographic areas and analyzed for specific radioisotopes showed from 3.4 to 7.4 micromicrocuries of Strontium 90 per liter of milk. The maximum permissible concentration of Strontium 90 is about 80.0 micromicrocuries per liter of milk.

The pilot study is part of a broad program of environmental analysis which includes amounts of radioactivity in water, air, and food. Milk was chosen for the initial study of foods since it is among the most important foods and because it is produced throughout the year in all sections of the country.

RETIRED

The following persons were recently retired from the Public Health Service: (Commissioned officers) Glen H. Algire, Medical Director, Henry A. Rasmussen, Medical Director, and Frank J. Milloy, Senior Surgeon; (Civil Service) Mrs. Lucille M. Boehm and Mrs. Doris C. Phebus.

POLIO

It is gratifying to see the marked reduction in the number of poliomyelitis cases. This crippling disease is yielding to the campaign against it. By continued action the disease can be held in check but already it appears that the American people are becoming complacent. One of the manufacturers of the Salk vaccine has reported a large amount of the vaccine on hand and at the same time we hear that there are many persons who should be vaccinated that are not taking advantage of this simple procedure.

It is now recommended that the Salk vaccine be given at the time the diphtheria-tetanus-pertussis vaccine is given to children. Some would give it even earlier.

Dr. Jonas Salk recently reported to the American College of Physicians that those vaccinated against polio may retain immunity to the paralytic type of the disease without any detectable antibody level. It is assumed, of course, that he means an individual must have the three recommended doses of the vaccine.

Drs. Gordon C. Brown and Catherine J. Carroll of Michigan recently noted that a pregnant woman given polio shots passed on antibodies to her unborn child and that the higher the mother's polio antibodies, the longer-lasting the infant's natural immunity. Let us constantly urge polio vaccination.

MEASLES AND HEPATITIS

The Morbidity and Mortality Weekly Reports from the Public Health Service have shown a large increase in the number of measles cases in the country this year. Over a half million cases of the disease have been reported so far.

Cases of hepatitis, both the infectious and serum type, are running about the same as last year.

POISON CONTROL CENTERS

The first city-wide integrated and organized Poison Control Center was established in Chicago in 1953. To combat this major public health threat these centers are being established throughout the country.

A National Clearing House for Poison Control Centers of the United States Department of Health, Education and Welfare has been established. This Clearing House supplies forms for the reporting of poison cases, gathers data and distributes monthly bulletins and information regarding new products to the local Poison Control Centers.

TRACHOMA MANUAL

Trachoma Manual and Atlas is a new handbook which gives the differential diagnosis and treatment procedures for trachoma. This is a 42-page illustrated manual by Phillips Thygeson, M.D., clinical professor of ophthalmology, University of California School of Medicine. Copies of the manual (PHS Publ. No 541) can be obtained from the Superintendent of Documents, Gov't. Printing Office, Wash. 25, D.C. for 55¢ a copy (no stamps).

REPORT ON INJURED

During the last six months of 1957 about 25 million Americans were injured enough to require medical attention or to limit their activities for at least a day.

Injuries during this period resulted in almost 214 million days of restricted activity, including 55.5 million days spent in bed at home or in a hospital.

The *Preliminary Report on Number of Persons Injured, U.S., July-Dec. 1957* (USPHS No. 584-B-3) can be obtained from the Sup't. of Documents, Gov't. Printing Office, Wash. 25, D.C. at 30¢ a copy.

PUBLICATION AVAILABLE

Small Plant Health and Medical Programs is a 212-page book available upon request to Inquiries Branch, Public Health Service, Dep't. Health, Education, and Welfare, Washington 25, D.C. No charge for a single copy.

DENTAL PUBLICATION AVAILABLE

The *Digest of Prepaid Dental Care Plans, 1958*, a 46-page publication covering all known plans in the United States, is available on request from the Division of Dental Resources, Public Health Service, Dep't. Health, Education, and Welfare, Washington 25, D.C.

CEREBROVASCULAR DISEASES

Copies of the study, "A Classification and Outline of Cerebrovascular Diseases," which is the result of two years' research by eight of the Nation's leading physicians on the subject of brain strokes, can be obtained from the National Institute of Neurological Diseases and Blindness, Bethesda 14, Md.

LABORATORY REFRESHER COURSES

The following laboratory refresher courses will be given between September 1958 and April 1959 at the Communicable Disease Center. Information and application blanks may be obtained from the Laboratory Branch, Communicable Disease Center, U.S. Public Health Service, P.O. Box 185, Chamblee, Ga.

1958

Sept. 15-Oct. 10—Laboratory Methods in the Diagnosis of Parasitic Diseases. Part 1. Intestinal Parasites. Course No. 8.00.

Oct. 6-10—Laboratory Methods in the Diagnosis of Rabies. Course No. 8.26.

Oct. 13-24—Laboratory Methods in the Diagnosis of Viral and Rickettsial Diseases. Course No. 8.20. (Virus Lab., Montgomery, Ala.)

Oct. 13-31—Laboratory Methods in the Diagnosis of Parasitic Diseases. Part 2. Blood Parasites. Course No. 8.01.

Oct. 20-31—Laboratory Methods in the Diagnosis of Tuberculosis. Course No. 8.55.

1959

Jan. 5-30—Laboratory Methods in Medical Mycology, Cutaneous, Subcutaneous and Systemic Fungi. Course No. 8.15.

Jan. 12-16—Laboratory Methods in the Diagnosis of Rabies. Course No. 8.26.

Jan. 26-Feb. 6—Laboratory Methods in the Diagnosis of Tuberculosis. Course No. 8.55.

Feb. 9-20—Laboratory Methods in the Study of Pulmonary Mycoses. Course No. 8.17.

Mar. 2-6—Laboratory Diagnostic Methods in Veterinary Mycology. Course No. 9.40.

Mar. 2-13—Laboratory Methods in the Diagnosis of Bacterial Diseases. Part 1. General Bacteriology. Course No. 8.40.

Mar. 9-20—Laboratory Methods in the Diagnosis of Viral and Rickettsial Diseases. Course No. 8.20. (Virus Lab. Montgomery, Ala.)

Mar. 16-27—Laboratory Methods in the Diagnosis of Bacterial Diseases. Part 2. General Bacteriology. Course No. 8.41

Mar. 16-Apr. 3—Serologic Methods in Microbiology. Course No. 9.41.

Mar. 30-Apr. 10—Laboratory Methods in the Diagnosis of Bacterial Diseases, Enteric Bacteriology. Course No. 8.50.

COURSES BY SPECIAL ARRANGEMENT ONLY:

Laboratory Methods in the Diagnosis of Malaria. Course No. 8.05.

Special Training in Virus Techniques. Course No. 8.21. (Virus Lab., Montgomery, Ala.)

Typing of Corynebacterium diphtheriae. Course No. 8.42.

Special Problems in Enteric Bacteriology. Course No. 8.51.

Phage Typing of Salmonella typhosa. Course No. 8.52.

Laboratory Methods in the Diagnosis of Leptospirosis. Course No. 8.53.

Bacteriophage Typing of Staphylococci. Course No. 8.56.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.

Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

TRIAMCINOLONE

A new drug, triamcinolone, was reported by Dr. Thomas H. McGavack of the Martinsburg, W.Va., Veterans Administration Center, as being especially suitable for old people and others with heart conditions in the treatment of arthritis, rheumatism, and allergies. Research has been going on for the past year with the drug.

ADRENALIN, DIGITALIS, AND HYPOTHERMIA

Adrenalin has been found to depress the heart when used in combination with digitalis and hypothermia. Such were the findings of Surgeon Theodore Cooper and pharmacologist Marion Cotton, of the National Heart Institute, NIH, Bethesda in their studies with dogs whose body temperature had been reduced 15 degrees below normal. This finding would seem to be of particular value in heart surgery where digitalis and hypothermia are used.

Preliminary studies with methoxamine, a blood pressure-raising drug, indicate that it is not blocked by the digitalis compounds.

ASSIGNMENTS

Dr. George J. Weinstein has been transferred from New York City to the Central Office of the Veterans Administration as Chief of Outpatient Psychiatry. In this position he will supervise the outpatient psychiatry program of the 65 VA mental hygiene clinics and 90 VA neuropsychiatric examination units.

Dr. Weinstein succeeds Dr. Raymond Feldman who has jointed the National Institutes of Health.

Dr. Claud E. Carter has been appointed as manager of the Veterans Administration hospital at Fresno, Calif. He is a graduate of the University of Oklahoma Medical School.

Dr. Roland Hipsley has been reassigned as manager of the VA hospital at Butler, Pa. He is a graduate of Western Reserve University.

Dr. Thomas L. Harvey has been assigned as manager of the New Orleans VA hospital. His former position was that of manager at Montgomery, Ala.

Dr. Daniel H. Miller, who has been with the Veterans Administration since 1932, will become manager of the VA hospital at Montgomery, Ala.

Dr. Alexander W. Kruger, who has been manager of the VA hospital in Brooklyn will be transferred to Muskogee, Okla., to become manager of the VA hospital there. He served with the Navy during World War II.

Dr. Henry L. Schmidt, Jr., director of professional services at the VA Manhattan

hospital in New York City has been appointed manager of the Brooklyn VA hospital. From 1946 to 1950 Dr. Schmidt was on the teaching staff of the Medical College of Georgia.

Dr. Harold J. Madsen has been appointed as manager of the VA hospital at Fort Lyon, Colorado to succeed Dr. Howard P. Morgan who retired March 31. Dr. Madsen is a native of Iowa and received his medical degree from Rush Medical College in 1938. He served with the Navy during World War II.

NURSES

Better appointment and promotion opportunities for qualified nurses in the Veterans Administration are provided by a new revision of VA standards for nursing grades and salaries.

Nurses who hold a bachelor degree in nursing from an educational program accredited by the National League for Nursing now may be appointed directly to the second of the five VA grades for nurses, the associate grade.

With three years of successful nursing practice, these nurses entering VA may be appointed directly to the third VA nursing grade, the full grade.

Nurses with a lesser educational background may be appointed to associate grade if they have two years of successful nursing practice and to full grade if they have six years of successful practice.

Formerly from four to six years of experience were required for appointment to associate grade, depending on the applicant's education, and seven years of experience were required for the full grade.

SARCOIDOSIS

The Eastern pine tree has been linked to the disease sarcoidosis according to Dr. Martin M. Cummings, Director of the Veterans Administration Research Service. Two chemicals found in the wax from the pollen are similar if not identical to materials found in sarcoidosis lesions by British investigators.

Additional evidence of a link between the tree and the disease is a chart which shows the birthplace of 1,200 veterans with sarcoidosis who live on the East Coast; few cases are found in those who were natives of the Western United States.

DIAGNOSIS OF MILD DIABETES

Sodium tolbutamide injected into the blood stream has been found to be of value in the diagnosis of mild diabetes. Extensive clinical evaluation of the test has been made at the Veterans Administration hospital in Dallas, Texas by Drs. Roger H. Unger and Leonard L. Madison, University of Texas Southwestern Medical School.

The blood sugar level is determined 20 and 30 minutes after injection of the sodium tolbutamide. Non-diabetics show a rapid decline in blood sugar level, whereas the level in diabetic patients falls much more slowly. The principle of the test is based upon the presumed ability of sodium tolbutamide to stimulate the insulin-producing cells of the pancreas to release more insulin.

MENTAL PATIENTS RELEASED

The Veterans Administration has reported that 6,736 mental patients have been placed on trial visit to their home communities during the first six months of fiscal year 1958, and 13,200 during the entire fiscal year 1957. The 1957 figure represents a 73 percent increase over the 1953 figure.

There are approximately 57,400 veterans hospitalized for mental illness, of whom 4,900 are of the less severe type.

REDUCED TUBERCULOSIS COST

Caring for tuberculosis patients in the Veterans Administration hospitals has cost less in the past three fiscal years. It is estimated that the saving has been about 38 million. Because of the newer methods of treatment the hospital stay has been reduced to about one year as compared to two years formerly required. Then there has been a reduction in the relapse rate from about 35% to 5%.

Miscellaneous

REGISTER OF DOCTORS IN THE U.S.

The *Official Register of Doctors in the U.S.* was born on April 30, 1958, when the State of Texas issued a charter legally incorporating The National Association of Doctors in the U.S. (NADUS) with headquarters at Incarnate Word College, San Antonio, Texas.

This will be the only official register of its kind in the United States. The register will list the names of male and female, American-born and foreign-born holders of earned academic or professional doctorate degrees conferred by an American or foreign institution of higher learning and residing in the U.S.

Consideration for listing in the Official Register will be by voluntary application to the secretary of the association subject to verification and confirmation of the requested information by the institution which conferred the doctorate.

The officers of The National Association of Doctors in the U.S. are: *President,* Dr. S. Thomas Greenburg, Vice-President of Incarnate Word College; *Vice-president,* Susan Marie Greenburg, Incarnate Word College; *Secretary-Treasurer,* Dr. Domenic A. Vavala, Professor of Altitude Physiology, Incarnate Word College.

MEMBER OF EDITORIAL BOARD

Ernest G. Abraham, M.D., F.I.C.S., of the Mount Sinai Hospital, New York, has been appointed a member of the Editorial Board of the Journal of the International College of Surgeons. In addition, he has been elected a member of the American Board of Legal Medicine. Dr. Abraham is medical director of the City of New York Division of Veterans' Affairs.

TO RETIRE

Surgeon Commodore Eric H. Lee, medical director-general of the Canadian Navy will begin retirement leave on September 8. He will be succeeded by Surgeon Captain T. Blair McLean of Edmonton and Victoria, who now is principal medical officer of HMCS Naden Navy Barracks at Esquimalt, B.C.

Doctor Lee is an Honorary Member of the Association of Military Surgeons of the United States.

Brigadier Stanley G. U. Shier, Director General of the medical services of the Canadian Army will retire on September 30. He will be succeeded by Colonel Pierre Tremblay who is now command medical officer for the Quebec command. Doctor Shier is an Honorary Member of our Association.

ATTENTION FORMER MEMBERS 7TH U. S. CAVALRY REGIMENT

In an effort to maintain the traditional Cavalry spirit in today's modern army, the 7th U. S. Cavalry Association has urged that all former members of that Regiment forward their name and address to: 7th U. S. Cavalry Association, 1932 West 43rd Place, Los Angeles 62, Calif.

SURGICAL CLEANLINESS

In a recent Becton, Dickinson Lecture at Seton Hall College of Medicine and Dentistry, Earle H. Spaulding, Ph.D., head of Temple University Medical School's Department of Microbiology, said, "The problem of hospital infections due to antibiotic-resistant staphylococci is an enormous one, and the prospect for the future is frightening. We should, of course, tighten all of our precedures including those involving disinfection."

Have we become careless in the well indoctrinated methods of pre-antibiotic days in the matter of surgical cleanliness? If so we should be disciplined again in those methods. The antibiotics have been a boon to medicine but they should not be expected to take the place of the methods that we learned years ago when it comes to cleanliness.

NEW FILMS AVAILABLE

Helping Hands for Julie, a 30 min. black and white sound film has been produced by

the AMA, AHA, and E. R. Squibb & Sons to help ease the growing need for young people in medical health careers.

The film is available now on a loan, no cost basis from the Association Films, Inc., 347 Madison Ave., New York 17, N.Y.

A new motion picture demonstrating the technic of retropubic prostatovesiculectomy has been prepared by Drs. McCleery Glazier and Louis J. Lombardo of the University of Southern California School of Medicine. The film has been produced in cooperation with Eaton Laboratories, Norwich, New York, and is available on request to Paul F. MacLeod, M.D., Medical Director of that company.

FILM STRIPS AVAILABLE

Business Management in Medical Practice is the name of a series of 10 films dramatizing the business problems of starting a new practice. The first film, *Where Should I Practice?*, the second film, *Financing the New Practice,* and the third film *Solo, Partnership, or Group Practice?* are now available. These films are for showing to medical students, interns, and residents.

For further information on these film strips write to the Professional Relations Director, Mead Johnson & Company, Evansville 21, Ind.

DOSIMETER FILM BOOKLET

A 14-page technical booklet (A-1009a) describing seven types of dosimeter films, useful exposure ranges, processing, and calibration, and a bibliography on dosimeter film usage, is available free from the Du Pont Company, Room N-2420-2, Wilmington 98, Delaware. You may write for your copy.

REPORT AVAILABLE

The Role of Dietary Fat in Human Health is available from the Publications Office, National Academy of Sciences, National Research Council, 2101 Constitution Ave., Washington 25, D.C., at $1 a copy.

ANNUAL REPORT-FCDA

The Annual Report for Fiscal Year 1957 of the Federal Civil Defense Administration is now available and can be purchased from the Superintendent of Documents, U. S. Government Printing Office for 30¢ per copy.

RESEARCH REPORTS AVAILABLE

Bacterial Electrophoresis Studies (PB-131484), is a 29-page report from the Naval Research Laboratory on the results of electrophoresis studies on five bacteria; 75¢ a copy.

Warfare Detection Equipment (PB-131401), is an 8-page report from the Naval Research Laboratory which describes a controllable source of vapor for demonstration of chemical warfare detection equipment; 50¢ a copy.

Studies on the Atomic Bomb Injuries in Hiroshima City, 1950. 40 pages; $1.25 a copy.

Unreliability of the Intra-Peritoneal Injection Route and the Validity of Experimental Observations (UR-516) Jan. 1958. 7 pages; 50¢ a copy.

Histologic Studies of the Early Healing Process in Moderate Second Degree Burns (UR-514) Dec. 1957, 21 pages; 75¢

The Effects of Some Locally Applied Medications on the Healing of Second Degree Burns (UR-518) Jan. 1958. 15 pages; 50¢

Part 1-Blood Volume Determinations with Radioactive Isotopes and Observations on Blood Volume Fluctuations; Part 2-Index of Cardiac Clearance (AECU-3614) March 1958. 49 pages; $1.00 a copy.

Copies of these publications may be obtained from the U. S. Dep't. of Commerce, Washington 25, D.C.

DERMATOLOGY AND SYPHILOLOGY COURSES

The following courses are offered at the New York University-Bellevue Medical Center Post-Graduate Medical School: *Comprehensive Review in Dermatologic Histopathology* (full-time—Sept. 8-12; tuition $85); *Dermatology and Syphilology for Pediatricians* (full-time—Oct. 6-10; tuition $85); *A seminar in Dermatology and Syphilology for General Physicians* (full-time—

Feb. 16-20, 1959; tuition $85); *A Symposium on Dermatology and Syphilology for Dermatologists* (full-time—May 18-22, 1959; tuition $100).

For further information write to: Associate Dean, New York University Post Graduate Medical School, 550 First Avenue, New York 16, N.Y.

FALL OUT

Remember when a "fall out" was when Junior fell out of bed? Algona (Ia) *Advance.*

RADIATION

Danger from radiation should be reckoned in terms of benefits obtained against hazards taken . . . I would violently oppose eliminating chest x-rays. The gains from early detection of disease far outweigh risks from radiation. Radiation should be used judiciously, but risks involved in riding in an automobile are far greater.

DR. HYMER L. FRIEDELL, radiology chief at Western Reserve University, addressing Cleveland Dental Society

PREVENTIVE MEDICINE

"We are becoming aware that preventive hygiene must expand beyond total inoculation for communicable disease to total service for every disabling condition, or we are liable to be afflicted by the consequence. The social loss or the social gain is shared by all."

MRS. PEARL HURWITZ, *Radcliffe College Quarterly,* Feb. '57.

MARRIAGE

"Marriage, an excellent institution, will be given a try by a good many starry-eyed couples this month (June). One of the best ways to keep the stars in the eyes is to keep the feet on the earth."

"Chat with the editor," *Changing Times,* June '58.

PARCELAIR

Fast and economical transportation of medicines and materials in the medical and health fields is said to be assured at economical rates by the inauguration of ParcelAir which will provide one to three-day delivery to any town in the country at rates comparable to surface transportation.

This is a division of American Shippers, Inc., which has been formed to handle packages of any dimension up to 40 pounds each. Special stamps for the service will eliminate some of the paper work involved in the handling of packages which in turn will save on transportation charges.

OBITUARIES

Col. Lucius L. Hopwood, U. S. Army, Ret.

Lucius L. Hopwood, Colonel, Medical Corps, U. S. Army, Retired, died at Brooke Army Hospital, Fort Sam Houston, Texas, on April 3 at the age of 78.

He was a native of Vinton, Iowa, and a graduate of Jefferson Medical College, in 1904. He entered the Army as a contract surgeon in 1905, became a student at the Army Medical School that year and graduated in 1906. He was then commissioned in the Army Medical Corps in which he served until his retirement for physical disability in 1932. Col. Hopwood served in the Philippines during the 2d Pulajan Rebellion in 1906, on the Mexican Border in 1916, and in World War I. During that war he commanded Field Hospital No. 2, the Pennsylvania Hospital-Columbia University Unit in France. He was a Fellow of the American College of Surgeons. He was awarded the Distinguished Service Medal.

Colonel Hopwood is survived by his widow, who resides at 227 Burr Road, San Antonio, Texas, and a daughter.

Interment was at Fort Sam Houston, Texas

Cdr. Edward V. Valz, USN, Ret.

Edward V. Valz, Commander, Medical Corps, U. S. Naval Reserve, Retired, died at the U. S. Naval Hospital, Philadelphia May 9 at the age of 79.

Doctor Valz was a native of Baltimore, Maryland and received his medical degree from the University of Virginia School of Medicine in 1903. He entered the Navy in 1907. He was a veteran of the Mexican and First Nicaraguan Campaigns and of World Wars I and II. He was placed on the Retired List in June 1937, and was called to active duty in Sept. 1939 and served until January 1943. He was a forty year life member of the Association of Military Surgeons, the American Medical Association, the Medical Society of Virgina, and the University of Virginia Medical Alumni Association.

He is survived by two sons, LCdr. Arthur M. Valz, USNR, of 80 Meetinghouse Lane, Springfield, Pa., and E. V. Valz, Jr., of Philadelphia; a daughter, Mrs. Marguerite I. Olson, 2019 W. Mistletoe St., San Antonio, Texas.

Capt. Dan R. Herkimer, MC, U. S. Navy, Res.

Dan R. Herkimer, Captain, Medical Corps, U. S. Navy, Reserve, died of a heart attack at Carpenter Hospital, Wayne, Michigan, May 11, at the age of 62.

Doctor Herkimer, a native of Maybee, Michigan, received his medical degree from the Wayne University College of Medicine in 1926. He had specialized in surgery. During the latter part of World War I he was in the Navy; during World War II he served at Parris Island, S.C., Camp Lejeune, N.C., and in Guam and Okinawa. He related to friends that during one engagement he operated continuously for 32 hours on battle casualties, stopping only for coffee and sandwiches.

He was a member of the American Medical Association, the International College of Surgeons, the Associations of Military Surgeons, and a Fellow of the American College of Surgeons.

He is survived by his wife who resides at 1802 Buckingham, Lincoln Park, Michigan.

Interment was at Maybee, Michigan.

Rear Adm. C. McA. Wassell, U. S. Navy, Res., Ret.

Corydon McAlmont Wassell, Rear Admiral, Medical Corps, U. S. Navy Reserve, Retired, died in Little Rock, Ark., on May 12, at the age of 73.

He was a native of Little Rock, Arkansas, and received his medical degree from the University of Arkansas in 1909. He left for China in 1914 and spent over 12 years there as a medical missionary. He worked with the Chinese National Red Cross and the International Red Cross, and during the early months of 1927 saw duty with the Yangtze Patrol. In 1940 he was called to active duty. In 1942 he evacuated 12 badly wounded men of the cruisers *Marblehead* and *Houston* from Java under heavy Japanese gunfire. He was decorated with the Navy Cross and President Franklin D. Roosevelt made the incident the subject of a nationwide radio broadcast. He attained the rank of Captain and upon his transfer to the Retired List August 1, 1946, he was promoted to Rear Admiral.

Admiral Wassell donated much of his life and knowledge to aiding people in remote areas. A novel, "The Story of Doctor Wassell," was written by the novelist James Hilton, and the film was produced by Cecil B. DeMille, which was premiered in April 1944 in Washington, D.C., and attended by Admiral Wassell.

Interment was in Arlington National Cemetery.

Col. Clarence M. Dollman, U. S. Army, Ret.

Clarence M. Dollman, Colonel, U. S. Army, Retired, died at Walter Reed Army Hospital, May 13 at the age of 79 of a heart ailment.

He was a native of Gala, Virginia. In 1901 he received his degree in chemistry from Virginia Polytechnic Institute and in 1907 his medical degree from George Washington University Medical School. In 1916 he participated in the Mexican Border Campaign and in World War I served as commanding officer of the 72nd General Hospital in France. Between the two World Wars he practiced medicine in Washington, D.C., and served as associate professor of internal medicine at Georgetown University Medical School. In 1939 he was recalled to active duty and assigned to Fitzsimons General Hospital where his participation in the establishment of an enlisted medical technicians' school led to his being named Commandant. In 1944 he was retired and then resumed his private medical practice in Washington.

He is survived by his wife who resides at 4956 Quebec, NW., Washington, D.C.; a daughter, and a grandson.

Interment was at Arlington National Cemetery.

NEW BOOKS

Books may be ordered through the Association

Proceedings of the Sixth International Congress of Hematology, Edited by Publications Committee, A. Richardson Jones, M.D., Chairman, Grune & Stratton, Inc., New York, N.Y. Price $25.00.

Regional Ileitis, Crohn and Yarnis, Grune & Stratton, Inc. New York, N.Y. Price $7.25.

Skin Grafting, James Barrett Brown, M.D., Frank McDowell, M.D. J. B. Lippincott Co., Philadelphia, Pa. (3rd Edition). Price $15.00.

Diagnostic Medical Parasitology, Edward K. Markell, Ph.D., M.D. Marietta Voge, M.A., Ph.D., W. B. Saunders Co., Philadelphia, Pa. Price $7.00.

Practical Cardiology, Albert Salisbury Hyman, M.D., F.A.C.P., F.A.C.C., McGraw-Hill Book Co., Inc., New York, N.Y. Price $7.00.

Rehabilitation of the Cardiovascular Patient, Paul Dudley White, M.D., Howard A. Rusk, M.D., Philip R. Lee, M.D., Bryan Williams, M.D. McGraw-Hill Book Co., Inc., New York, N.Y. Price $7.00.

Religious Doctrine and Medical Practice, Richard T. Barton, M.D., F.A.C.S., Charles C Thomas Co., Springfield, Ill.

Outline of Orthopaedics, John Crawford Adams, M.D. Williams & Wilkins Company, Baltimore, Md. Price $8.00.

Pediatric Index, Edwin F. Patton, M.D., C. V. Mosby Co., St. Louis, Mo. Price $13.50.

Diseases of the Thyroid and Parathyroid Glands, Bernard J. Ficarra, A.B., Sc.B., M.D., D.S., Intercontinental Medical Book Corp., New York, N.Y. Price $8.50.

Manual for the Aphasia Patient, Mary C. Longerich, Ph.D. Macmillan Co., New York, N.Y. Price $4.75.

Progress in Arthritis, John H. Talbott, M.D., L. Maxwell Lockie, M.D., Grune & Stratton, New York, N.Y. Price $12.50.

A Text on Systemic Pathology, Otto Saphir, M.D., Grune & Stratton Inc., New York, N.Y. (2 Vols.) Price $58.00.

Anomalies of Infants and Children, D. McCullagh Mayer, D.D.S., M.D. Wilson A. Swanker, M.D., McGraw-Hill Book Co., Inc., New York, N.Y. Price $12.00.

Psychoprophylactic Preparation for Painless Childbirth, Isidore Bonstein, M.D., Grune & Stratton, Inc., New York. Price $2.50.

Traumatismes Anciens—Generalites—Membre Superieur, R. Merle D'Aubigne, Editors, Masson Et C, 120 Boulevard Saint-Germain, Paris 6, France. Price 5900 francs.

Principles of Research in Biology and Medicine, Dwight J. Ingle, Ph.D., J. B. Lippincott Co., Philadelphia 5, Pa. Price $4.75.

Rehabilitation—A Community Challenge, W. Scott Allan, John Wiley & Sons, 440 Fourth Ave., New York 16, N.Y. Price $5.75.

The Brain and Human Behavior, Research Publication, Association for Research in Nervous & Mental Disease, The Williams & Wilkins Co., Baltimore, Md. Price $15.00.

Army Social Customs, Ester Wier, Military Service Publishing Co., Harrisburg, Pa. Price $3.00.

The Chemistry & Chemotherapy of Tuberculosis, Esmond R. Long, M.D., Williams & Wilkins Co., Baltimore, Md. Price $12.00.

Drugs of Choice, 1958-1959, Walter Modell, Editor C. V. Mosby Co., St. Louis 3, Mo. Price $12.75.

Handbook of Treatment of Acute Poisoning, E. H. Bensley, and G. E. Joron, The Williams & Wilkins Co., Baltimore, Md. Price $4.00.

Dynamic Anatomy and Physiology, L. L. Langley, Ph.D., E. Cheraskin, M.D., Ruth Sleeper, R.N., McGraw-Hill Book Co., Inc. Price $6.00.

A Short History of Anatomy & Physiology from the Greeks to Harvey, Charles Singer, Dover Publications, Inc. New York, N.Y. Price $1.75.

Atomic Physics and Human Knowledge, Niels Bohr, John Wiley & Sons, Inc., New York, N.Y. Price $3.95.

Bone & Radiostrontium, Arne Engstrom, John Wiley & Sons, Inc., New York 16, N.Y. Price $8.75.

The First Book of World War I, Louis L. Snyder, Franklin Watts, Inc., New York, N.Y. Price $1.95.

Clinical Enzymology, Gustav J. Martin, Sc.D. Little Brown & Co., Boston, Mass. Price $6.00.

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Reconstructive and Reparative Surgery, Hans May, M.D., F.A.C.S. 2nd Edit., F. A. Davis Co., Philadelphia, Pa. Price $30.00.

Hello! Hello! Hello! Doc, William W. Cleere, M.D. (Amusing Recollections and Anecdotes of a Country Physician) Exposition Press, Inc., New York, N.Y. Price $3.00.

Soldier in White, The Life of Gen. George Miller Sternberg, John M. Gibson, Duke University Press, Durham, N.C. Price $6.75.

The Psychiatric Hospital as a Small Society, William Caudill, Harvard University Press, Cambridge, Mass. Price $6.50.

Cardiovascular Diseases, Third Revised Edition, David Scherf, MD, F.A.C.P., Linn J. Boyd, MC, F.A.C.P., Grune & Stratton, New York, N.Y. Price $17.75.

Principles of Internal Medicine, Harrison, (3rd Edition) McGraw-Hill Book Co., New York, N.Y. 2 Vols. Price $24.00.

Science and Psychoanalysis, Jules H. Masserman, M.D. Grune and Stratton, New York, N.Y. Price $5.75.

Alcoholism, Arnold Z. Pfeffer, M.D., Grune & Stratton, New York, N.Y. Price $6.50.

Personal, Impersonal and Interpersonal Relations, A Guide for Nurses, Genevieve Burton, R.N., ED.D., Springer Publishing Co., Inc., New York, N.Y. $2.75.

Atomic Radiation, RCA Service Company, Camden, N.J. Price $1.60.

Operative Surgery, Vol. VII, Charles Rob, M.C., Rodney Smith, M.S., F.R.C.S., F. A. Davis Co., Philadelphia, Pa.

Aids to Medical Diagnosis, G. E. Frederick Sutton, M.C., M.D., F.R.C.P., Williams & Wilkins Co., Baltimore, Md. Price $3.50.

Ophthalmic Plastic Surgery, 2nd Ed., Sidney A. Fox, M.S. (Ophth.), M.D., F.A.C.S., Grune & Stratton, New York, N.Y. Price $15.00.

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Progress in Psychotherapy, Vol. III, Jules H. Masserman, M.D., J. L. Moreno, M.D., Grune & Stratton, New York, N.Y. Price $8.50.

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Diagnostic Laboratory Hematology, (2nd Rev. Edit.) George E. Cartwright, M.D., Grune & Stratton, New York, N.Y. Price $6.75.

Foundations of Nursing, Janet S. Ross, R.G.N., R.F.N., Kathleen J. W. Wilson, R.G.N., S.C.M., The Williams & Wilkins Co., Baltimore 2, Md. Price $4.00.

BOOK REVIEWS

ESSENTIALS OF CLINICAL PROCTOLOGY. By Manuel G. Spiesman, M.D., B.S., LL.D., F.I.C.P., Associate Professor of Proctology, Chicago Medical School; and Louis Malow, M.D., B.S., F.A.C.S., Associate in Surgery, Chicago Medical School. 316 pages, illustrated. Grune & Stratton, New York and London. 1957. Price $8.75.

Unusual contributions of this text are the sections on pectenosis, the critical surgical angle, management of coccygodynia and proctalgia fugax, and the relationship of amebiasis to resistant pruritis. Practically every significant proctologic entity is well handled in a separate chapter which deals succinctly with definition, etiology, pathogenesis, and treatment from both medical and surgical approaches.

Additional features of the text are the sections on anatomy, tables of differential diagnosis, pediatric proctology, constipation and diarrhea, and stool analysis. For students, general practitioners and the occasional proctologist this book amply fulfills the intention of its authors in providing a convenient reference of all essential and practical proctologic guidance.

Presentation in mixed styles of third and first person detracts somewhat from an overall objectivity. One is led to an inevitable conviction that the authors have had not only a wide and profound proctologic experience, but have profited sufficiently thereby to pass it on in broad, general and safely applicable surgical principles.

LT. COL. JAMES B. ANDERSON, USAF (MC)

PSYCHOSOMATIC MEDICINE. A CLINICAL STUDY OF PSYCHOPHYSIOLOGIC REACTIONS. 3rd Ed. By Edward Weiss, M.D., Professor of Clinical Medicine, Temple University Medical Center; and O. Spurgeon English, M.D., Professor and Head of Department of Psychiatry, Temple University Medical Center. 557 pages, 8 figures. W. B. Saunders Company, Philadelphia and London. 1957. Price $10.50.

This is a completely revised edition of a book which for more than a decade has played an influential part in spreading the gospel of psychosomatic medicine. Although the modern use of the term "psychosomatic" by Dunbar dates back only to 1935 the impact since that time of the revitalized mind-body concept has been of tremendous importance in all branches of medicine and surgery. So convinced are the authors that the purely mechanistic approach in medicine is a thing of the past that they actually "question whether a book on psychosomatic medicine is any longer necessary." It is this reviewer's opinion that the golden age has not quite arrived and that it is much too soon for Drs. Weiss and English to contemplate literary hari-kari. There are still many die-hards in the profession who refuse to admit that emotional factors are of the utmost importance in such varied conditions as chronic urticaria, duodenal ulcer and bronchial asthma, and that only through a study of the total personality can one hope for an effective form of treatment. Fortunately the work on stress factors of Selye incorporated in the "General Adaption Syndrome" gives firm evidence that psychopathology is commonly a precursor of tissue-pathology.

This book is well written in a pleasant, informal style. The table of contents and index are unusually complete and helpful. Each chapter has a summary of subject matter, and the numerous case reports are instructive both as to diagnosis and treatment. No physician can leave this truly humanistic approach to our common problems without feeling that he has been granted a keener insight into the mind of his patient as well as a more complete understanding of his own responsibilities.

LT. COL. MORRIS H. SAFFRON, MC, USAR

ORTHOPEDIC SURGERY IN THE MEDITERRANEAN THEATER OF OPERATIONS—Medical Department, United States Army, Surgery in World War II. Edited by Mather Cleveland, M.D., Associate Editor, Elizabeth M. McFetridge, M.A., Editor-in-Chief, Colonel John Boyd Coates, Jr., MC, USA. 368 pages, illustrated. Superintendent of Documents, Government Printing Office, Washington, D.C. Price $4.25.

This book is a portion of the History of Surgery in World War II that is being published by the Office of the Surgeon General, Department of the Army. It is an excellent treatise, illustrating the process of evolution by which orthopedic surgery in the Mediterranean Theater of Operations developed. The early endeavors culminated in a superb treatment of the combat-incurred injuries of the extremities.

The problems of the logistic situation in North Africa, the time lag between wounding and treatment of both emergency and definitive nature, and the nature of most combat-incurred wounds, all

made the usual civilian type management of compound wounds of the extremities inapplicable.

The policies of management worked out early in the North African campaign, the Sicilian campaign, and the Italian campaign resulted in an extremely high percentage of good results in the management of compound fractures and wounds of joints during the latter portion of the Italian campaign and became the basis of the directives governing the treatment of such wounds during the European invasion, Operation Overlord.

This book is a "must" for all military surgeons and also should form the basis of courses in traumatic surgery in a medical school so the valuable lessons learned shall never be forgotten.

LT. COL. DAVID C. KELLSEY, USAF (MC)

RETIREMENT FROM THE ARMED FORCES. Prepared by a Committee of Retired Army, Navy, and Air Force Officers. Foreword by Lt. Gen. Willard S. Paul, USA, Ret. 431 pages. The Military Service Publishing Company, Harrisburg. Price $4.75.

The purpose of this book is to furnish comprehensive information, related to retirement, to those nearing retirement, those already retired, to families, and their survivors. Essential facts have been obtained from official documents, and gleanings from valuable opinions have been used from thousands of questionnaires returned by retired personnel of all Services. Worthwhile experiences by members of the publishing staff have also been recorded. Information is furnished for officers and enlisted personnel of the Regular Services, National Guard, and Reserves.

Without discussing each of the valuable chapters, worthy of special mention are: planning retirement, where to locate and how to acquire a home, getting an appropriate job, benefits from savings and investments, Social Security privileges, and the Veterans Administration benefits. Types of retirement, pertinent procedures and pay computations are fully discussed.

The appendices describe the Retired Officers Association, location of the various Veterans Administration offices, and suggested forms for record and information concerning personal affairs especially for the use of survivors.

This book should be of considerable value, to all concerned, both for immediate reading and for frequent reference purposes.

COL. EDWARD A. COATES, JR., USA, RET.

ORTHOPEDIC SURGERY IN THE EUROPEAN THEATER OF OPERATIONS, WWII. Office of the Surgeon General of the Army. Mather Cleveland, M.D., Colonel, MC, AUS. Editor-in-Chief, John B. Coates, Jr., Col. USA. 397 pages, illustrated. Superintendent of Documents, Government Printing Office, Washington 25, D.C. 1956. Price $4.00.

This significant history prepared by Mather Cleveland, the senior orthopedic consultant in the ETO, and Marshall Urist shows in minute detail the problems encountered in preparing for the treatment of mass casualties with bone and joint injuries and of the evolution of the techniques that were ultimately used so successfully. It describes the evolution of the consultant system which enabled a handful of trained orthopedists to guide the work of a large number of relatively inexperienced personnel.

As Colonel Cleveland points out, many of these techniques that were ultimately developed had been used in later days of World War I and adequately documented in "both the British and American official histories of the medical experience of World War I. It would have proved extremely valuable if it had been put to immediate use in World War II. It was not. Almost no use was made of these techniques in the interim between the wars." It is unfortunate that this volume was so long in preparation for much of this material was imperfectly known and utilized by the inexperienced medical officers that had to be rushed into Korea with the onset of hostilities. It is a lucid guide to military planning and to the techniques of management of casualties involving injuries to bones and joints.

If the knowledge contained in this inexpensive book is widely disseminated it will avoid a repetition of past mistakes. It should be read by all military surgeons and all others who are called upon to treat trauma.

CAPT. WILLIAM S. STRYKER, MC, USN

SYNOPSIS OF GASTROENTEROLOGY. By Rudolph Schindler, M.D., F.A.C.P., Clinical Professor of Medicine (Gastroenterology), College of Medical Evangelists. 395 pages. Grune & Stratton, New York and London. 1957. Price $7.75.

The announced intention of this book in the author's preface is that it is specifically for the General Practitioner and Internist, chiefly to be consulted for the management of individual cases. The index and cross reference feature of the book have been very well done. The chapter on "Diseases of the Stomach and Duodenum" are exceptionally useful as is the chapter on "Functional Disorders."

Other parts of the book leave something to be desired. For example, the value of the book would be enhanced by mentioning specific dosages and the chances of therapeutic success and complications to be expected from their employment. The liver function test discussion is curiously deficient in certain aspects; specifically, no discussion of the diagnostic value of the alkaline phosphatase determination is made and the other features of the laboratory tests of liver function are presented in a haphazard fashion.

The chapters on the small intestine and colon and

rectum have a splendid discussion of some of the rare disorders but an inadequate discussion of the more common conditions.

The book is recommended for inclusion in the library of the specialist in gastroenterology.

COL. RYLE A. RADKE, USA, RET.

FUNDAMENTALS OF CLINICAL FLUOROSCOPY. 2nd Ed. By Charles B. Storch, M.D., Associate Attending Roentgenologist, Radiodiagnostic Department, Beth-El Hospital, Brooklyn. 305 pages, illustrated. Grune & Stratton, Inc., New York and London. 1957. Price $8.75.

This is the second edition of a publication which was printed and reprinted in 1951. The first edition has met with favor because of the author's enthusiastic descriptions of the fundamentals and diagnostic details pertaining to the fluoroscopic insights of study. The current edition provides elaboration of these details in an easy-to-read manner with additional sections: in particular, considerations as to the application of image magnification, cineradiography and an excellent section on fluoroscopic maneuvers practical for identifying at least the main groupings of congenital heart lesions.

Technical aspects are considered. Following brief descriptions of such, warnings as to exposure hazards are cited: i.e. "the dosage rate measured at the panel should be less than 20 r per minute at the maximum kilovoltage"—though in the case of some in operation, "the r/min at the panel were found to be as high as 127—an erythema dose would be reached in about 2 minutes." He emphasizes the application of practical knowledge in this regard stating that of 70 patients incurring mal-effects by radiation studied, 35 were physicians, though only 3 of these were radiologists.

An excellent chapter is appropriated to fluoroscopy of the chest in general. Separate chapters are provided for fluoroscopy of the heart and congenital heart disorders. Then follow similar dissertations on the pharynx, hypopharynx and esophagus, the stomach, the small bowel, the colon, intestinal obstruction, and the gall bladder. With each topic, there are first considered fundamental aspects of anatomy, physiology, positioning etc.; these followed by normal study patterns and variants, and then with proper emphasis, descriptions of findings in various pathological conditions. The subject matter is presented by text descriptions and also by touched-up reproductions and drawings to clearly demonstrate diagnostic findings. The question and answer method is applied frequently, especially in captioning of figures viz:

Question: What is the density in the upper mediastinum?

Fluoroscopic examination:

1. The trachea, being deformed (lower arrow) indicates proximity of mass to the trachea.
2. When the patient was asked to swallow, the dense shadow was noted to rise (upper arrow).

Answer: A density in the superior mediastinum fulfilling these requirements is most likely due to a thyroid tumefaction.

Thus the reader is attracted to the figures. One's wits are immediately challenged and interest is stimulated for the analyses and answer. In fact whether a beginner or experienced fluoroscopist, the graphic presentations provide interest and edification. One can easily "browze" through a chapter in a few minutes and do so repeatedly for reminder of proper thinking for those occasions when alertness of thought is so important.

The text is supported by a well chosen selection of references. It is concisely indexed.

COL. A. A. DE LORIMIER, USA, RET.

OPERATIVE SURGERY—Vol. 3. (Set to include 8 vols.) Rectum and Anus; Thorax. Edited by Charles Rob, M.C., M.Chir., F.R.C.S., Professor of Surgery, St. Mary's Hospital, London; and Rodney Smith, M.S., F.R.C.S., Surgeon, St. George's Hospital, London. 215 pages, illustrated. F. A. Davis Company, Philadelphia. 1957. Price $19.50 vol.

Volumes I and II of this 8-volume work have already been reviewed. The present review deals with Volume III only. The first part of this volume is a continuation of Surgery of the Abdomen. Half of the first volume and all of the second volume dealt with Surgery of the Abdomen. The only part remaining, which occupies approximately one-third of the third volume, was Surgery of the Rectum. This includes proctoscopy, surgery of benign (including pilonidal sinus) and malignant conditions of the rectum. The remaining slightly more than two-thirds of this volume deals with Surgery of the Thorax, including Bronchoscopy, Operations on the Chest Wall, the Lungs, the Heart, Pericardium, Great Blood Vessels, Mediastinum and Esophagus.

This volume continues the pattern of the previous volumes in laying the emphasis on illustrations with only short descriptions in the text. It is intended as a handy method for the surgeon to refresh his memory on those operations which he does not perform too frequently. Certainly some of the operations described in this volume though, especially those dealing with congental anomalies of the heart, should never be performed by the occasional operator.

The illustrations, while not of the highest quality, are on the whole clear and satisfactory. Only one of the operative procedures for rectal prolapse is given and in that neither the illustrations nor the text are clear. This is the exception rather than the rule, however.

In treating excision of the chest wall, including the ribs, for tumors, only stainless steel mesh is

offered as a prosthesis for repairing the defect in the chest wall. The author of this section has evidently overlooked the fact that it has been amply demonstrated (Koontz and Kimberly, Ann. Surg., *137*, 823, 1953) that much better results are obtained in such situations by the use of tantalum mesh, rather than stainless steel mesh. Stainless steel remains inert in the tissues, while the tantalum oxide film covering the surface of the wires in tantalum mesh actually stimulates the growth of fibroblasts. The use of the latter as a prosthesis, therefore, creates a much stronger thoracic or abdominal wall. This is highly important in the thorax where stability of the thoracic wall is highly desirable because of the constant movement caused by respiration.

This volume, as in the case of the first two, will make a valuable addition to any surgical library.

AMOS R. KOONTZ, M.D.

IT PAYS TO BE HEALTHY. By Robert Collier Page, M.D., F.A.C.P., 285 pages. Prentice-Hall, Inc., New York. 1957. Price $4.95.

Authoritative, practical and very readable—this timely volume deals with the many problems confronting workers of all types from janitors to top executives. The author explains the relationship of such problems to health and disease, and how to cope with them. Many specific job problems and illnesses are evaluated, including emotional disturbances, obesity, ulcers, alcoholism, heart diseases, nervous upsets and family difficulties. Among other things Dr. Page stresses: (1) evaluation of each person as a whole, (2) proper preventive measures, (3) the need for a satisfactory home environment and (4) careful selection of a family physician. The approach to the problem of retirement is especially noteworthy. Many interesting case histories enhance this book's value. Herein will be found much excellent information to help make life healthier and happier. Those in business, especially those in executive capacities, should make this outstanding volume MUST reading.

COL. H. P. MARVIN, U.S.A., RET.

CRAIG AND FAUST'S CLINICAL PARASITOLOGY—6th Ed. By Ernest Carroll Faust and Paul F. Russell with the editorial assistance of David R. Lincicome. 1078 pages. Lea and Febiger, Philadelphia, 1957. Price $15.00.

This is the sixth edition of the well known text that was previously designated as "Clinical Parasitology" by Craig and Faust. This new edition has been thoroughly revised and brought up to date by the authors.

Section I which serves as a "General Introduction and Orientation" has been rearranged and enlarged. New tables are included dealing with "Diagnostic Criteria" and "Treatment."

Section II has been revised and the portion on malaria completely rewritten. In the chapter on *Endomoeba histolytica* there is a useful compilation of data on the incidence and distribution of this parasite in the Western Hemisphere. However, no attempt is made to cover similarly the Eastern Hemisphere although data are cited in the text. It is unfortunate that the authors omitted any reference to the series of epidemiologic surveys carried out by the Army (1947-1951) on 23,000 Japanese, Okinawans and South Koreans. *Pneumocystis* is added to this section.

The revision of Section III includes the addition of material on visceral larval migrans and the treatment of *Echinococcus multilocularis* as a separate species.

Both the material on the Arthropods and the "Technical Appendix" have undergone considerable revision.

It is perhaps unfortunate that the authors chose to anglicize some of the Latin nouns, such as "cercarias," "larvas," etc., since students may become confused by this terminology especially when consulting other literature.

The text is well printed on good paper and attractively bound. Both the authors and publishers deserve congratulations on producing a most useful book for those interested in the field of human parasitology.

COL. GEORGE W. HUNTER, III, U.S.A., RET.

CARDIOVASCULAR COLLAPSE IN THE OPERATING ROOM. By Herbert E. Natof, M.D., Ass't in Anesthesia; and Max S. Sadove, M.D., Professor of Surgery (Anesthesiology), both of the University of Illinois College of Medicine. 197 pages. J. B. Lippincott Company, Philadelphia and Montreal. 1958. Price $6.00.

This is an excellent and exhaustive presentation of an increasingly encountered major problem in the rapidly developing surgery of this era. The authors have built a background by reviewing the published literature and the analysis of all cases of "cardiac arrest" which occurred at the University of Illinois Neurosurgical Amphitheater, and Illinois Eye and Ear Infirmary during the three-year period ending January 1, 1956.

The emphasis placed on the physiologic mechanisms and the multiplicity of factors involved which may bring about cardiac collapse is a highlight of the book. Dr. Warren H. Cole's foreword that "all physicians will profit from reading this volume" is conservative.

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REFERENCES: 1) Smith, R. T.: To be published. 2) Holley, H. L.: Personal communication. 3) Passarelli, E. W.: Personal communication. 4) Peak, W. P., and Smith, R. T.: To be published. 5) Settel, E.: Personal communication. 6) Wiesel, L. L.: Personal communication.

Further information regarding action, indications and dosage available on request.

*Trade-mark †U. S. Patent Pending

McNEIL Laboratories, Inc. · Philadelphia 32, Pa.

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